



New Academic Program Workflow Form

General

Proposed Name: Med Device Technology Dev

Transaction Nbr: 00000000000224

Plan Type: Major

Academic Career: Undergraduate

Degree Offered: Bachelor of Science

Do you want to offer a minor? N

Anticipated 1st Admission Term: Sprg 2026

Details

Department(s):

MDTC

DEPTMNT ID	DEPARTMENT NAME	HOST
0702	Surgery	Y

Campus(es):

MAIN

LOCATION	DESCRIPTION
TUCSON	Tucson

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

Plan admission types:

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

Non Degree Certificate (UCRT only): N

Other (For Community Campus specifics): N

Plan Taxonomy: 51.1199, Health/Medical Preparatory Programs, Other.

Program Length Type: Program Length Value: 0.00

Report as NSC Program:

SULA Special Program:

Print Option:

Diploma: Y Medical Device Technology Development

Transcript: Y Medical Device Technology Development

Conditions for Admission/Declaration for this Major:

There are no additional admission/declaration of major requirements for this degree.

Requirements for Accreditation:

There is no specialized accreditation required for this degree program.

Program Comparisons

University Appropriateness

The BS in MDTD 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.

Arizona University System

NBR	PROGRAM	DEGREE	#STDNTS	LOCATION	ACCRDT
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Peer Comparison

All programs have a focus on understanding the function of medical devices. The MS degree from University of Minnesota and the BS degree from New Jersey Technical Institute share a focus on design, innovation and development with the proposed MDTD program. Target careers for the three programs share significant overlap with the proposed MDTD program. The truly unique aspect of

the proposed MDTD program is that it has a lower math requirement, requiring only College Algebra and statistics. The other programs require some form of Calculus. The MDTD program has some exposure to biomedical engineering and an additional focus on regulation, policy, physiology, and business. The only peer program that shares those additional subjects is the Master's degree from University of Minnesota.

Resources

Library

Acquisitions Needed:

Physical Facilities & Equipment

Existing Physical Facilities:

We will use existing COM-T physical facilities (classrooms and laboratories) and equipment for this program. The COM-T Comprehensive Education Core (CEC) will also support this program.

Additional Facilities Required & Anticipated:

N/A

Other Support

Other Support Currently Available:

We will use existing COM-T staff for this program. COM-T Comprehensive Education Core (CEC) will also support this program.

Other Support Needed over the Next Three Years:

N/A

Comments During Approval Process

7/10/2024 3:42 PM

MELANIECMADDEN

Comments
updating proposed name to remove degree type, abbreviating "Medical Device Technology Development" which exceeds system character limits



NEW ACADEMIC PROGRAM – MAJOR Preliminary Proposal Form

I. Program Details

- a. **Name (and Degree Type) of Proposed Academic Program:**
Bachelor of Science in Medical Device and Technology Development (CIP CODE – 51.1199, College of Medicine)
 - i. Emphasis 1: Medical Technology – Device
 - ii. Emphasis 2: Medical Technology – Biotech/Pharma
 - iii. Emphasis 3: Medical Technology – Business and Marketing/Media
 - iv. Emphasis 4: Medical Technology – Regulatory-Law-Government
 - v. Emphasis 5: Basic and Clinical Medical Sciences
- b. **Academic Unit(s)/College(s):** Life Sciences, Engineering, Business, & Law
- c. **Campus/Location(s):** Main Campus
- d. **First Admission Term:** Fall 2025
- e. **Primary Contact and Email:** slepian@arizona.edu

II. Executive Summary:

- Medical Device, Pharma and Biotech are the core of diagnosis, therapy, and prevention of disease and vital for driving health for Arizonans and others around the world.
- A broad group of competencies is required to advance, steward, and grow the field of medical devices - beyond the pure engineering or chemical technical aspects, e.g. understanding the market, developing ergonomic design, being facile with regulation, understanding financing and interfacing in educating the public.
- The MDTD program is unique in that specifically encompasses all the skill sets – the conceptual, soft and verbal financial and legal skills, beyond the purely technical.
- This major will yield graduates that are “job ready” - with a pull existing in the market ready for such graduates to fill ranks in the corporate, government, and private sectors.

III. Brief Program Description:

The Bachelor of Science in Medical Device and Technology Development (MDTD) is a four-year degree program designed and delivered as a collaboration between clinicians, basic scientists, engineers, business and law, with focus on learning about the medicine and the medical device field and related technologies, providing students with multiple avenues upon graduation. The program would allow students to learn the basics in the medical and health field while expanding into areas of interest that would include the business of medical devices, the creation, design and engineering of devices, as well as the legal/regulatory and communication and marketing components of medical devices. The program juxtaposes applied topics such as what it is to be an individual that helps develop medical devices; or goes into the marketing, sales or use of devices; or processes and work in the regulatory fields of medical devices; and/or goes onto professional degree programs that would allow one to utilize such devices in their health care field. The rapidly growing field of medical devices and the MDTD BS program would allow for hands-on experience through simulation and actual device use in addition to information delivered in the classroom setting.

IV. **Program Rationale:**

The BS in Medical Device and Technology Development is a multi-disciplinary degree program involving collaboration with UArizona programs in Life Sciences, Engineering, Business, and Law. The program provides a broad range of electives for in-depth study, including in medical sciences, emergency medicine, aging in medicine, medical ethics, biomedical engineering, bioinformatics, integrative medicine, and climate change as a factor in medical care. It also offers training in regulatory science, legal aspects of technology development and stewardship and business and financial aspects as well.

Faculty involved in design and oversight of the program are clinicians, medical scientists, engineers, business and law professionals who contribute significantly to their corresponding fields at UArizona. This faculty expertise ensures that the BS in MDTD 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 devices and related technologies – drugs, combinational products and biotech, as well as virtual/telemedicine as healthcare tools, medical content knowledge, and the hands-on skills using simulation and shadowing to prepare for the many and diverse health care jobs/careers available.

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

Year 1	Year 2	Year 3
25	75	125

VI. **Evidence of Market Demand:**

There are multiple components of medical device translational pathways from product ideation to patient use including intellectual property (IP) creation, business planning, engineering, preclinical testing, clinical trials, and statistical analysis of benefits and risks, reimbursement, and integration into practice guidelines. The U.S. Food and Drug Administration (FDA) Center for Devices and Radiological Health (CDRH) plays a key regulatory role in the device development process. With a rapidly aging population, the shift toward delivering in-home healthcare, and the increasing prevalence of diabetes, hypertension, and other chronic diseases are key developments expected to boost medical device sales in the next decade. Simultaneously, technological advances are revolutionizing the medical device industry, not only increasing the number of connected, patient-centric medical devices going to market but also strengthening their role in healthcare. The global medical devices market totaled \$489 billion in 2021 and may top \$500 billion in 2022. One estimate forecasts the market expanding to \$719 billion by 2029 — an annualized rate of 5.5% from 2022 to 2029.

For up-and-coming graduates looking to kickstart their MDTD careers to experienced health technology professionals eager for their next challenge, the medical device technology development industry offers an abundance of opportunities for candidates at all stages of their careers. In the USA alone, the industry is responsible for the creation of over 2 million jobs, and given the unstoppable growth of innovative health technologies, it is likely that the sector will continue creating employment opportunities for the foreseeable future.

With the demand for medical technology professionals far outpacing supply, now is a better time than ever for high-quality graduates to pursue careers in MDTD. As well as excellent job prospects, MDTD candidates can expect relatively high salaries, the possibility of rapid career

advancement, the chance to make a positive difference for global well-being, and a lifetime of interesting challenges and advancement opportunities.

Employers Struggling to Fill Drug and Medical Device Development Positions:

Hoffmann-La Roche, BioMarin Pharmaceutical Inc., Cardinal Health, Nanoshift LLC, Scimitar Inc., BlueAllele, Genentech, Foundation Patents, Innovate Biopharmaceuticals, Morgans Financial, Proctor & Gamble, IQVIA, Johnson and Johnson, Abbott

Most biological technicians/technologists struggle with the following concepts due to the lack of academic preparation in the following areas:

- Strategy, Reimbursement, and Proof of Concept
- Intellectual Property, Outcome Measures, Trials, and Indications
- Software, Target Selection and Drug Discovery, and Absorption, Distribution and Metabolism
- Diagnostics, Biomarkers, and Wearable Devices

Top 6 Medical Device Technology Development Jobs:

Since med tech is an umbrella term that covers a lot of job profiles, given below are some of the most notable med tech jobs that you can apply for:

- Medical Device Designer
- Healthcare Data Analyst
- Telemedicine Specialist
- Health IT Consultant
- Biomedical Engineer
- Clinical Informaticist

VII. Similar Programs Offered at Arizona Public Universities:

There is no program such as the one proposed herein at the University of Arizona or any other ABOR Universities. For that matter this is a unique undergraduate major in the U.S. This program is complementary and synergistic to majors at UArizona, such as Biomedical Engineering or the BS in Medicine, but distinct in its focus and coverage. These other programs are not focusing on the broad field of medical devices, biotech or pharma – specifically the related disciplines as to how to advance, translate, market operate regulate advertise, legislate or otherwise financially support these technologies. The other majors focus on the pure technical side and are math heavy, which this program is not. There is a real need for a non-math broad focused major where graduates will have ready jobs.

VIII. Resources

a. Summarize new resources required to offer the program:

No new faculty are needed to instantly begin and grow the program. All resources are in place.

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

a. Program Director/Main Proposer:


i. Signature: _____

ii. Name and Title: Marvin J Stepien MD
Regents' Professor - Medicine, Surgery, BME

iii. Date:

2/22/24

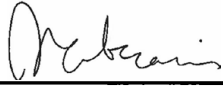
b. **Managing Unit/Department Head:**

i. **Signature:**  _____

ii. **Name and Title:** Geoffrey Gurtner, MD Professor and
Chair, Surgery Professor, Biomedical

iii. **Date:** engineering
2/22/24

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

i. **Signature:**  _____

ii. **Name and Title:** Michael M.I. Abecassis, MD, Dean, College of Medicine - Tucson

iii. **Date:** 2/22/24



ADDITIONAL INFORMATION FORM To be used once preliminary proposal has been approved.

I. MAJOR REQUIREMENTS—

UNDERGRADUATE

Total units required to complete the degree	120
Upper-division units required to complete the degree	42
Foundation courses	
Second language	Second Semester Proficiency
Math	Moderate Math Strand MATH 112
General education requirements	<u>General Education: (23 units)</u> UNIV 101 – General Education UNIV 301 – General Education Capstone e-Portfolio 3 courses/9 units - Building Connections 1 course/3units Exploring Perspectives – Artist 1 course/3units Exploring Perspectives – Humanist 1 course/3units Exploring Perspectives – Social Scientist 1 course/3units Exploring Perspectives – Natural Scientist
Pre-major? (Yes/No).	No
List any special requirements to declare or gain admission to this major	None
Major requirements	
Minimum # of units required in the major (units counting towards major units and major GPA)	49
Minimum # of upper-division units required in the major (upper division units counting towards major GPA)	32
Minimum # of residency units to be completed in the major	18
Required supporting coursework (courses that do not count towards major units and major GPA, but are required for the major).	<u>Statistics Requirement (3 units)</u> Choose one: MATH 163 Basic Statistics (3 units)

ADDITIONAL INFORMATION FORM

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	<p>MATH 263 Introduction to Statistics and Biostatistics (3 units) BME 376: Biomedical Statistics (3 units)</p> <p><u>General Sciences: (28 units)</u> MCB 181R & L Introduction to Biology & Lab (4 units) ECOL 182R & L Introductory Biology II (4 units)</p> <p>CHEM 130 and 130L Chemistry for Allied & Public Health (4 units) OR CHEM 141 and 143/145 or CHEM 151 General Chem I (4 units) or CHEM 161 Honors Chem I (4 units)</p> <p>PHYS 102/181 Physics I and Lab (4 units) PHYS 103/182 Physics II and Lab (4 units)</p> <p>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.</p>	<p><u>Major Core: (37 units)</u> BSM 101 Introduction to Medical Care (2 units)</p> <p>BSM 305 Intro to Medical Devices, Technologies, Biotech and Pharma (3 units, New)</p> <p>BSM 441 Diagnostic Technologies and Their Role in Healthcare (3 units) PHCL 386 Intro to Tech Transfer in Medicine (3 units) BSM 4** Med Device, Biotech, Pharma Hands on Exposure and Clinical Applications (3 units, New)</p> <p>ENG/MED 481A/581A – Innovation, Translation and Entrepreneurship (2 units)</p> <p>ECON 200 – Basic Economic Issues (3 units) ACCT 250 – Survey of Accounting (Info for Business Decisions) (3 unit) BNAD 302 – Human side of Organization (3 units) BNAD 303 – Marketing Principles, Concepts, and Tools (3 units)</p> <p>LAW 478A - Legal & Regulatory Aspects for Health Care Delivery (3 units)</p>

ADDITIONAL INFORMATION FORM

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	<p>LAW 479B - Legal & Regulatory Fundamentals of Health Care Business (3 units)</p> <p>LAW 480B - Data Privacy & Cybersecurity in Health Care (3 units)</p> <p><u>Emphasis 1- Medical Technology-Device</u> (12 units)</p> <p>BME 486 Biomaterial-Tissue Interactions (3 units)</p> <p>CMM 465 Fundamentals of Light Microscopy and Digital Imaging</p> <p>LAW 476A Drug Discovery, Development, and Innovation to Reach the Marketplace (3 units) – not currently offered to undergrads</p> <p>BME 4** Technology and Big Data in Individualized Care (3 units, New)</p> <p>FCM 4** Clinical Application of Medical Technology (3 units, New)</p> <p>BSM 319 The History of Medical Technology (2 units)</p> <p>MED 497 Research Development and Publishing (3 units)</p> <p>PHP 205 Fundamentals of Telehealth (3 units)</p> <p>HSD 401 Design for Health Workshop: Addressing Human Health Challenges with Design Thinking (Gen Ed Building Connections) (3 units)</p> <p>HSD 410 Device Design in the Health Sciences: Developing Tools for Health Care Solutions using Design Thinking (3 units)</p> <p>HSD 420 Healthy Design Practices: From the Makerspace to the Community (3 units)</p> <p>BME 295C Challenges in Biomedical Engineering (1 unit)</p> <p><u>Emphasis 2- Medical Technology-Biotech/Pharma</u></p> <p>PHCL 412 Intro to Pharmacology (3 units)</p> <p>PHCL 4** Drug Discovery and Development (3-12 units)</p> <p>PHCL 460 Designing Drugs – from Chemistry to Cure (3 units)</p> <p>CHEE 489 Trends in Nanomedicine Engineering - Fundamentals of Therapeutics and Drug Delivery Systems (3 units)</p> <p>MED 497 Research Development and Publishing (3 units)</p> <p><u>Emphasis 3- Medical Technology-Business and Marketing/Media</u></p>
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	<p>BNAD 301 Global and Financial Economics and Strategies (3 units) OR BNAD 304 Survey of Finance (3 units)</p> <p>MGMT 438 Healthcare Organization and Management (3 units)</p> <p>ENTR/MGMT 448 Healthcare Entrepreneurship (3 units)</p> <p>JOUR 480 Advanced Multimedia</p> <p>JOUR 497B Advanced Photojournalism</p> <p>JOUR 306 Advanced Reporting</p> <p>JOUR 385 Beginning Television Reporting and Production</p> <p>JOUR 280 Broadcast Writing</p> <p>JOUR 433 Digging with Data</p> <p>MED 497 Research Development and Publishing (3 units)</p> <p>MKTG 307 Advertising Strategy & Practice</p> <p>MKTG 453 Brand Management</p> <p>MKTG 309 Marketing Communications in the Digital Age (2 units)</p> <p>MKTG 361 Introduction to Marketing (3 units)</p> <p>MKTG 306 Consumer Behavior (2 units)</p> <p>MKTG 423 Digital Marketing (3 units)</p> <p>MKTG 458 Health Care Marketing (3 units)</p> <p><u>Emphasis 4- Medical Technology-Regulatory-Law-Government</u></p> <p>LAW 488A Translational Pathways for Medical Devices</p> <p>LAW 475D Leadership and Equity in the Life Sciences</p> <p>LAW 480C Health Information Technology</p> <p>LAW 415 Health Care Ethics</p> <p>LAW 480A Liability & Regulation of Health Care Professionals</p> <p>LAW 484C Technology and Aging: Legal & Ethical Developments</p> <p>LAW 477 Introduction to Biomedical Informatics (3 units) – same as BME 477</p> <p>PHPM 310 Health Care in the U.S. (3 units)</p> <p>LAW 452 Health Law (3 units)</p> <p>LAW 478A Legal and Regulatory Aspects of Healthcare Delivery (3 units)</p> <p>PHIL 321 Medical Ethics (3 units)</p> <p>FCM 302 Clinical Health Disparities in Sexual and Gender Minority (SGM) Populations (3 units)</p>
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ADDITIONAL INFORMATION FORM

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	<p>FCM 402/502 Addressing Health Disparities through Interprofessional Clinical-Community Collaboration (3 units)</p> <p>HIST 373 Politics of Health and Medicine in the Americas: From Historical Roots to Contemporary Development (3 units)</p> <p>BSM 320 Law and Medicine – Parallel Comparisons Through Time (3 units)</p> <p>MED 497 Research Development and Publishing (3 units)</p> <p>JOUR 420 Digital Communications Law</p> <p><u>Emphasis 5- Basic and Clinical Medical Sciences</u></p> <p>CHEM 152 Chemical Thinking II and Lab (4 units)</p> <p>CHEM 241A and 243A Organic Chemistry I and Lab (4 units)</p> <p>CHEM 241B and 243B Organic Chemistry II and Lab (4 units)</p> <p>BIOC 384 Foundations in Biochemistry (3 units)</p> <p>BIOC 385 Metabolic Biochemistry (3 units)</p> <p>CMM 401 Gross Anatomy (Summer course only) (4 units)</p> <p>CMM 437 Immunology Basics (1 unit)</p> <p>CMM 427 Pathophysiology Basics (1 unit)</p> <p>CMM 428 Pathophysiology of Integumentary, Respiratory & Digestive Systems (1 unit)</p> <p>CMM 429 Pathophysiology of Urogenital and Endocrine Systems (1 unit)</p> <p>MED 497 Research Development and Publishing (3 units)</p> <p>PHCL 445 Drugs of Abuse (3 units)</p> <p>PHCL 430 Pain (2 units)</p> <p>PHCL 444 Human Neurobiology Basics (1 unit)</p> <p>PSIO 427 Metabolism and Disease (3 units)</p> <p>PSIO 450 Respiratory Physiology (3 units)</p> <p>PSIO 452 Digestive Physiology (3 units)</p> <p>PSIO 465 Systems Neurophysiology (3 units)</p> <p>PSIO 469 Human Reproductive Physiology (3 units)</p> <p>PSIO 485 Cardiovascular Physiology (3 units)</p> <p>PSIO 487 Physiology of Aging (3 units)</p> <p>PHCL 442 Human Performance Pharmacology (3 units)</p> <p>PCOL 410 Medicinal Chemistry (3 units)</p>
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	<p>PCOL 355 Drug Delivery Systems (3 units)</p> <p>PCOL 350 ADME: How the Body Changes Drugs (3 units)</p> <p>IMB 402 Medical Microbiology Basics (1 unit)</p> <p>IMB 404 Medical Virology Basics (1 unit)</p> <p>MCB 301 Molecular Basis of Life (4 units)</p> <p>MCB 304 Molecular Genetics (4 units)</p> <p>BSM 318 Medicine – Past, Present and Future (3 units)</p> <p>HPS 433 Global Health (3 units)</p> <p>HIST 311 History of Epidemics (3 units)- Cross list as MED 311</p> <p>FCM 424/524 Arts and Community Health Intercultural Perspectives and Applications Parts I-III (1-3 units)</p> <p>BSM 303 Difficult Conversations in Patient Care: The Art of Empathy (1 unit)</p> <p>FCM 410/510 Substance Misuse in Maternal and Child Health Populations (3 units)</p> <p>FCM 496A Advancements in Substance Misuse Research and Clinical Care Seminar (2 units)</p> <p>EMD 147 Emergency Medical Technician (4 units)</p> <p>EMD 350 Advanced Emergency Medical Services Systems (3 units)</p> <p>NSC 275 Fundamentals of Precision Nutrition and Wellness (3 units)</p> <p>NSC 310 Principles of Human Nutrition in Health and Disease (3 units)</p> <p>BSM 301 Healthcare Professional Well-being (1 unit)</p>
<p>Internship, practicum, applied course requirements (Yes/No). If yes, provide description.</p>	<p><u>Optional working towards required (to be phased in)</u></p> <p>New MED 4** Med Device, Biotech, Pharma Hands on Exposure and Clinical Applications (3 units) (Marv Slepian, Kellen Chen, Todd Vanderah)</p> <p>FCM 498 Community Health Field Training Experience (2 units)</p> <p>New PATH 4** Clinical Skills (path, pharm, phlebotomy, EKG, imaging, etc.) (2 units) (Mark Nelson)</p> <p>New FCM 4** Reflections on Clinical Medicine through Clinical Shadowing (Karyn Kohlman)</p>
<p>Senior thesis or senior project required (Yes/No). If yes, provide description.</p>	<p>No</p>



ADDITIONAL INFORMATION FORM To be used once preliminary proposal has been approved.

Additional requirements (provide description)	No
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.

II. CURRENT COURSES–

Course prefix and number (include cross-listings)	Units	Title	Pre-requisites	Modes of delivery (online, in-person, hybrid)	Typically Offered (F, W, Sp, Su)	Dept signed party to proposal? (Yes/No)
MATH 163 Equivalent to: DATA 361, DATA 363, MATH 160, MATH 160-CC, MATH 163-CC, MATH 263, MATH 263-CC, MATH 363	3	Basic Statistics	PPL 60+ or MCLG 88+ or SAT I MSS 640+ or ACT MATH 26+ or one recent course from MATH 108, 112, 113, 116, 119A, 122B, or 125.	In-person	F, Sp	
MCB 181R Equivalent to: BIOC 181R, ECOL 181R, MCB 184, MCB 315, MIC 181R	3	Introduction to	PPL 40+ or SAT I MSS 560+ or ACT MATH 24+ or one course from Math 108, 112, 113, 119A, 120R, 124,	In-person,	F, Sp, Su	

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			122B, 125, 129, or 223.			
MATH 263 Equivalent to: DATA 361, DATA 363, MATH 160, MATH 160-CC, MATH 163-CC, MATH 361-CC, MATH 363		Introduction to	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, Su	
CHEM 130	4	Chemistry for Allied & Public Health	Algebra recommended	In-person, online	F, Sp, Su	
PHYS 102/181 or PHYS 141/142	4	Physics I	PPL 60+ or SAT I MSS 610+ or ACT MATH 26+ or one course from MATH 108, 112, 113, 116, 119A, 120R, 122B, 125, 129, or 223 PHYS 141: MATH 122B, 124, or 125, or appropriate Math Placement Level	In-person, online PHYS 141: In-person	In-person: F, Sp, Su PHYS 102 Online: F PHYS 141: F, Sp, Su	
PHYS 103/182 or PHYS 241	4	Introductory Physics II	PHYS 102 OR PHYS 141 or PHYS 140 or PHYS 161H	In-person, online	F, Sp, Su	
AREC 239	4	Introduction to Statistics and Data Analysis	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	
BME 376	3	Biomedical Statistics	MATH 129 and Advanced standing	In-person	F	

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PSIO 201	4	Human Anatomy and Physiology I and Lab		In-person	F, Sp, Su	
PSIO 202	4	Human Anatomy and Physiology II and Lab	PSIO 201	In-person	F, Sp, SU	
BSM 101	2	Introduction to Medicine	None listed	In-person	F, Sp	Yes
BSM 4**	3	Introduction to Medical Devices, Technologies, Biotech and Pharma				Yes
BSM 441	3	Diagnostic Technologies and Their Role in Healthcare	PSIO 201 & 202	In-person	F, Sp	Yes
ENTR 481A Equivalent to: BME 481A, ENGR 481A, ENTR 481A, LAW 481A, OPTI 481A, PATH 481A, SOC 481A	2	Innovation, Translation and Entrepreneurship	None listed	In-person	Sp	Yes
ECON 200	3	Basic Economic Issues	None listed	In-person, Flex in-person, online	F, W, Sp, Su	
ACCT 250	3	Survey of Accounting (Info for Business Decisions)	None listed	In-person	F, Sp, Su	
BNAD 302	3	Human Side of Organization	None listed	In-person	Contact Department	
BNAD 303	3	Marketing Principles, Concepts, and Tools	None listed	In-person	Contact Department	
LAW 478A/578A	3	Legal & Regulatory Aspects for Health Care Delivery	None listed	Online	F	
LAW 479B/579B	3	Legal and Regulatory Fundamentals for Health Care Business	None listed	Online	Sp	

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LAW 480B/580B	3	Data Privacy & Cybersecurity in Healthcare	None listed	Online	Sp	
PHCL 386 Also offered as BSM 386	3	Intro to Tech Transfer in Medicine	None listed	In-person	F	Yes
CMM 465	3	Fundamentals of Light Microscopy and Digital Imaging				
LAW 476A	3	Drug Discovery, Development, and Innovation to Reach the Marketplace	None listed	online	not been scheduled	
BSM 319	2	Medical Technology - Past, Present & Future	None listed		not been scheduled	Yes
PHP 205	3	Telehealth: It is not just about Clinical Care	None	Online	F	
HSD 401	3	Design for Health Workshop: Addressing Human Health Challenges with Design Thinking	First-Year English Composition: (ENGL 101 and 102) or (ENGL 103H and 104H) or (ENGL 107 and 108) or ENGL 109H.	In-person	F, Sp	
HSD 410 Also offered as BSM 410	3	Device Design in the Health Sciences: Developing Tools for Health Care Solutions using Design Thinking	Junior or Senior standing AND previous completion of Calculus I (MATH 122B, or MATH 125, or equivalent transfer course), or with instructor permission.	In-person	F, Sp	
HSD 420 Also offered as HSD 476, INFO 476	3	Healthy Design Practices: From the Makerspace to the Community	None listed	In-person	Sp	
CHEM 152	4	Chemical Thinking II	CHEM 151 or 141/143 or 161/163 and 1 of	In-person	F, Sp, Su	

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			the following: PPL 60+ or SAT I MSS 610+ or ACT MATH 26+ or one course from MATH 108, 112, 113, 119A, 120R, 122B, 125, 129, or 223. Test scores expire after 2 years.			
CHEM 241A and CHEM 243A	4	Organic Chemistry I and Lab	CHEM 105B/106B or CHEM 142/144 or CHEM 152 or CHEM 162/164, completion Concurrent registration encouraged.	In-person	F, Sp, Su	
CHEM 241B and CHEM 243B	4	Organic Chemistry II and Lab	CHEM 241A or CHEM 242A or CHEM 246A. Concurrent registration in CHEM 243B is encouraged. Credit allowed for only one of the following: CHEM 241B or CHEM 242B or CHEM 246B.	In-person	F, Sp, Su	
BIOC 384	3	Foundations in Biochemistry	MCB 181R and (CHEM 142 or CHEM 152 or CHEM 105B or CHEM 162) and (CHEM 241A or CHEM 242A or CHEM 246A). BIOCBA and BIOCBS Students may not enroll.	In-person	F, W, Sp, Su	
BIOC 385	3	Metabolic Biochemistry	MCB 181R and (CHEM 142 or CHEM 152 or	In-person	F, W, Sp, Su	

ADDITIONAL INFORMATION FORM
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			CHEM 105B or CHEM 162) and (CHEM 241A or CHEM 242A or CHEM 246A). BIOCBA and BIOCBS Students may not enroll.			
CHEE 489	3	Trends in Nanomedicine Engineering - Fundamentals of Therapeutics and Drug Delivery Systems	Advanced Standing: Engineering. MATH 254 and (CHEM 481 or CHEM 480A or [BIOC 462A and 462B]).	In-person	Sp	
PHCL 412	3	Intro to Pharmacology	Students are strongly encouraged (but not required) to have taken at least one course in human anatomy and/or physiology prior to enrolling in this course.	In-person	F	Yes
BNAD 301	3	Global and Financial Economics and Strategies	ECON 200 or (ECON 201A and ECON 201B).	In-person	Contact Department	
BNAD 304 Equivalent to BAD 304	3	Survey of Finance	None listed	Online	Contact Department	
ENTR 448 Also offered as MGMT 448	3	Healthcare Entrepreneurship	None listed	In-person	Sp	
JOUR 280	3	Broadcast Writing	Major: JOUR. JOUR 205 with a C or better.	In-person	Sp	
JOUR 306	3	Advanced Reporting	Major: JOUR. JOUR 205 with a C or better.	In-person	F, Sp	
JOUR 385	3	Beginning Television Reporting and Production	Major: JOUR. JOUR 203 and JOUR 280.	In-person	F, Sp	
JOUR 433	3	Digging with Data	None listed	In-person	Sp	

ADDITIONAL INFORMATION FORM
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JOUR 480	3	Advanced Multimedia	Students must EITHER take JOUR 307 OR [JOUR 319 and SBS 350].	In-person	Sp	
JOUR 497B	3	Advanced Photojournalism	Major: JOUR. JOUR 203.	In-person	Sp	
MGMT 438 Equivalent to PA 438	3	Health Care Organization and Management	None listed	In-person	F, Sp	
MKTG 306	2	Consumer Behavior	BNAD 303 and one of the following: ACCT 200, ECON 200 or MKTG 301. Acceptance into Marketing Minor Program, contact department.	Online	Su	
MKTG 307	2	Advertising Strategy & Practice	BNAD 303 and one of the following: ACCT 200, ECON 200 or MKTG 301. Acceptance into Marketing Minor Program, contact department.	Online	Su	
MKTG 309 – Marketing Communications in the Digital Age	2		BNAD303 and one of the following: ACCT 200, ECON 200 or MKTG 301.	Online	Su	
MKTG 361	3	Introduction to Marketing	Professional Admission: Accounting, Business Administration, Business Management,	In-person	F, Sp, Su	



ADDITIONAL INFORMATION FORM
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			Business Economics, Entrepreneurship, Finance, Marketing, Management Information Systems, Operations & Supply Chain Management.			
MKTG 423	3	Digital Marketing	Professional Admission: Marketing. MKTG 361.	In-person	F, Sp	
MKTG 453	3	Brand Management	None listed	In-person	F, Sp	
MKTG 458 Also offered as PHPM 458	3	Health Care Marketing	Majors: Public Health, Marketing, Public Management, Public Management & Policy, Business Administration, and Entrepreneurship. Senior status.	Online	Sp	
FCM 302	3	Clinical Health Disparities in Sexual and Gender Minority (SGM) Populations	None listed		F	
FCM 402/502	3	Addressing Health Disparities Through Interprofessional Clinical - Community Collaborations	None listed		not been scheduled	
HIST 373 Also Offered as LAS 373	3	Politics of Health and Medicine in the Americas: From Historical Roots to Contemporary Development	None listed	Online	Sp	

ADDITIONAL INFORMATION FORM

To be used once preliminary proposal has been approved.

JOUR 420	3	Digital Communications Law	Open to Journalism, eSociety, and Law majors.	In-person	Varies	
LAW 415	3	Health Care Ethics	None listed		Not been scheduled	
LAW 452	3	Health Law	None listed	In-person	F	
LAW 475D	3	Leadership and Equity in the Life Sciences	None listed	Online	Sp	
LAW 480C	3	Health Information Technology	None listed	Online	F	
LAW 484C	3	Technology and Aging: Legal & Ethical Developments	None listed	Online	F	
LAW 488A	3	Translational Pathways for Medical Devices	None listed	Online	Su	
LAW 478A	3	Legal and Regulatory Aspects of Healthcare Delivery	None listed	Online	F	
LAW 480A	3	Liability and Regulation of Healthcare Professionals	None listed	Online	Su	
BSM 320	3	Law and Medicine: Parallel Comparisons Through Time	Students who completed Medicine - Past Present and Future MED 318 are ineligible to take this course.		not been scheduled	Yes
PHIL 321 Also Offered as: PA 321	3	Medical Ethics	2 courses from Tier One - Traditions/Cultures	In-person, online	F, W, Sp, Su	
PHPM 310	3	Health Care in the U.S.	Two courses from Tier One- Individuals/Societies.	In-person, online	F, Sp	

ADDITIONAL INFORMATION FORM

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AIS 435 also offered as LAS 435, MAS 435	3	Mexican Traditional Medicine: An Overview of Indigenous Curing Cultures	None listed	In-Person	F, Sp	
BIOC 466	4	Biochemistry of Nucleic Acids	BIOC 462A	no longer offered	Sp	
CHEM 241B & CHEM 241B Equivalent to CHEM 242B, CHEM 246B	4	O. CHEM II w/ lab	CHEM 241A or CHEM 242A or CHEM 246A Concurrent registration in CHEM 243B is encouraged. Credit allowed for only one of the following: CHEM 241B or CHEM 242B or CHEM 246B.	In-Person	F, Sp	
CMM 444	1	Embryology II	None listed	Online	Sp	
CMM 445	1	Embryology III	None listed	Online	Sp	
CMM 401	4	Gross Anatomy	None listed	In-Person	Su	
CMM 404	3	Cell Biology of Disease	None listed	In-Person	Su	
CMM 427	1	Pathophysiology Basics (1 unit)		Online	F	
CMM 428	1	Pathophysiology of Integumentary, Respiratory & Digestive Systems (1 unit)		Online	F	
CMM 429	1	Pathophysiology of Urogenital and Endocrine Systems (1 unit)		Online	F	
CMM 437	1	Immunology Basics	Introductory biology, including basic cell biology.	Online	Sp	
CMM 443	1	Embryology Basics	None listed	Online	Sp	

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EMD 147	4	Emergency Medical Technician	BLS Provider CPR certification care is required prior the first day of class. There are multiple locations in the Tucson area to receive this training.	In-Person	Contact Dept	
EMD 350	3	Advanced Emergency Medical Services Systems	None	Online	Varies	
BSM 303	1	Difficult Conversations in Patient Care: The Art of Empathy	None	In-Person	F, Sp	Yes
FCM 410	2	Substance Misuse in Maternal and Child Health Populations	This course has not been scheduled since modification.	Live Online	F	
FCM 424/524 A/B/C Also Offered As MUS 424A/B/C	3	Arts and Community Health Intercultural Perspectives and Applications	None	Online	Sp	
FCM 496A	2	Advancements in Substance Misuse Research and Clinical Care Seminar	None		not been scheduled	
FCM 498	3	Field Training Experience in Community Health	None listed		not been scheduled	
HIST 311	3	History of Epidemics	None listed	Online	F, Su, Sp	
HPS 433 Equivalent to CPH 433, CPH 433-CC, CPH 433-SA, HLTH 433	3	Global Health	HPS/CPH 200 (Gen ED Social Scientist) and EPID/CPH 309.	In-Person	F, Sp	
IMB 402	1	Medical Microbiology Basics	General biology, molecular or cellular biology recommended.	Online	F, Sp	
IMB 404	1	Medical Virology Basics	None listed	Online	F, Sp	

ADDITIONAL INFORMATION FORM

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MCB 301	4	Molecular Basis of Life	MCB Majors Only - conferring with dept. Must have completed Intro Biology (MCB 181R and MCB 181L) and first semester Organic Chemistry (CHEM 241A and CHWM 243A OR CHEM 242A and 242B).	In- Person	Sp	
MCB 304	4	Molecular Genetics	Students must have completed MCB 301 MCB 181R, MCB 181L; CHEM 103A and CHEM 104A or CHEM 151; concurrent registration, CHEM 241A and CHEM 241B recommended.	In- Person	F	
BSM 301	1	Healthcare Professional Well-being	None	In- Person	F, Sp	Yes
BSM 318	3	Medicine – Past, Present and Future	Students who completed MED 320 Law and Medicine - Parallel Comparisons Through Time are ineligible to take this course.		Not been scheduled.	Yes
NSC 275	3	Fundamentals of Precision Nutrition and Wellness	None	In- Person	F	
NSC 310	3	Principles of Human Nutrition in Health and Disease	Tier Two Natural Sciences course requisite: two courses	Online	F, Sp	

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			from Tier One Natural Sciences.			
PCOL 325	3	Controversies in Health Care Practice	None listed	In-Person	F, Sp	
PCOL 350	3	ADME: How the Body Changes Drugs	PSIO 380 prerequisites OR PSIO 202 co-requisite AND CHEM 241B+243B or CHEM 246B+247B. PCOL 360 is recommended.	In-Person	Sp	
PCOL 355	3	Drug Delivery Systems	CHEM 241B + CHEM 243B	In-Person	F	
PHCL 430	2	Pain/Neuropharmacology	PHCL 412 or 512 and 3 units of Biochemistry (300 or higher) and 8 units of Physiology (200 or higher).	In-Person	F	
PHCL 442	3	Human Performances Pharmacology	4 Units Physiology OR 4 Units Biology and 4 Units Chemistry.	In-Person	F, Sp	
PHCL 444	1	Human Neurobiology Basics	At least one course in basic human physiology	Online	F	
PHCL 445	3	Drugs of Abuse	None listed	Online	Sp	
PSIO 427	3	Metabolism and Disease	Major: PSIO or PSIOM or MEDBS, or Minor: PSIO or PSIOM. Must have a C or better in PSIO 201 and PSIO 202.	In-Person	F	
PSIO 450	3	Respiratory Physiology	Major: PSIO or PSIOM or MEDBS, or Minor: PSIO or PSIOM. Must	In-Person	Sp	

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			have a C or better in PSIO 201 and PSIO 202.			
PSIO 452	3	Digestive Physiology	Major: PSIO or PSIOM or MEDBS, or Minor: PSIO or PSIOM. Must have a C or better in PSIO 201 and PSIO 202.	In-Person	F	
PSIO 465	3	Systems Neurophysiology	Major: PSIO or PSIOM or MEDBS, or Minor: PSIO or PSIOM. Must have a C or better in PSIO 201 and PSIO 202.	In-Person	Sp	
PSIO 469	3	Human Reproductive Physiology	Major: PSIO or PSIOM or MEDBS, or Minor: PSIO or PSIOM. Must have a C or better in PSIO 201 and PSIO 202.	In-Person	Sp	
PSIO 485	3	Cardiovascular Physiology	Major: PSIO or PSIOM or MEDBS, or Minor: PSIO or PSIOM. Must have a C or better in PSIO 201 and PSIO 202.	In-Person	F, Sp	
PSIO 487	3	Physiology of Aging	Major: PSIO or PSIOM or MEDBS, or Minor: PSIO or PSIOM. Must have a C or better in PSIO 201 and PSIO 202.	In-Person	F	

ADDITIONAL INFORMATION FORM
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PSIO 497A	3	Physiology of Mind-Body Interactions	Department Consent Required Must be a PSIO or PSIOM major with advanced standing and a C or better in PSIO 201 and PSIO 202, or must be a PSIOMMINU or PSIOMINU with a C or better in PSIO 201 and PSIO 202.	no longer offered	F, Sp	
MED 497/597	3	Research Development and Publishing	Instructor Consent Required	In-Person	F, Su, Sp	

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

Course prefix and number (include cross-listings)	Units	Title	Pre-requisites	Modes of delivery (online, in-person, hybrid)	Status*	Anticipated first term offered	Typically Offered (F, W, Sp, Su)	Dept signed party to proposal? (Yes/No)	Faculty members available to teach the courses
BSM 305	3	Introduction to Medical Devices, Technologies, Biotech and Pharma	NA	Hybrid	D	Fall 2026	F, Sp	Yes	Yes
BSM 441	3	Diagnostic Technologies and Their Role in Healthcare	PSIO 201 & 202	In-person	S	Fall 2024	F, Sp		Yes



ADDITIONAL INFORMATION FORM

To be used once preliminary proposal has been approved.

BME 4**		Technology and Big Data in Individualized Care	NA	Hybrid	D	Fall 2027	Fall	Yes	Yes
FCM 4**		Clinical Application of Medical Technology	NA	In person	D	Fall 2028	Fall, Spring	Yes	Yes
PHCL 4**		Drug Discovery and Development	NA	Hybrid	D	Fall 2027	Fall, Spring	Yes	Yes

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

IV. FACULTY INFORMATION-

Faculty Member	Involvement	UA Vitae link or Box folder link
Marv Slepian	Chair, organizing committee; Regents Professor Medicine, Surgery and BME	
Todd Vanderah	Senior Advisor and Co-Associate Chair, organizing committee; Dept Head, Pharmacology	
Kellen Chen	Co-Associate Chair, organizing committee; Surgery	
Jameshia Granberry	Member, organizing committee; COM-T	
Ann Pagel	Member, organizing committee; College of Management	
Jayanthi Sunder	Member, organizing committee; College of Management	
Mario Romero-Ortega Philip Gutruf	Member, organizing committee; BME	
Tara Sklar Keith Swisher	Member, organizing committee; Law	
Doug Hockstad Rakhi Gibbons	Member, organizing committee; Tech-Launch	
Michael Abecassis	Member, organizing committee; Dean College of Medicine- Tucson	



ADDITIONAL INFORMATION FORM
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V. GRADUATION PLAN –

Semester 1		Semester 2		Semester 3		Semester 4	
Course prefix and number	Units	Course prefix and number	Units	Course prefix and number	Units	Course prefix and number	Units
MATH 112	3	CHEM 130 and 130L	4	ECOL 182R	3	General Ed- Exploring Perspectives Social Scientist	3
ENGL 101/107/109H	3	ENGL 102	3	ECOL 182L	1	General Ed- Building Connections Option*	3
BSM 101	2	MCB 181R	3	PHYS 102/ 110	3	PHYS 103/ 111	3
Gen Ed-Building Connections	3	MCB 181L	1	PHYS 181	1	PHYS 182	1
Second Semester Second Language	4	MATH 163/263, BME 376 Statistics	3	ACCT 250	3	PSIO 201	4
UNIV 101 Gen Ed	1	ECON 200	3	General Ed- Exploring Perspectives Humanist*	3	BSM 305	3
Total	16	Total	17	Total	14	Total	17

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
PSIO 202	4	BNAD 303	3	General Elective	1	Emphasis Elective	3
BSM 441	3	MED 481A	2	LAW 478A	3	Emphasis Elective	3



ADDITIONAL INFORMATION FORM

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PHCL 386	3	LAW 480B	3	LAW 479B	3	General Elective	3
General Education- Exploring Perspectives Artist	3	General Education- Building Connections Option	3	Emphasis Elective	3	General Elective	3
BNAD 302	3	BSM 4** Med Device, Biotech Pharma	3	Emphasis Elective	3		
		UNIV 301- General Education	1				
Total	16	Total	15	Total	13	Total	12



ADDITIONAL INFORMATION FORM
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VI. Learning Outcomes and Curriculum Map -

Learning Outcomes

Learning Outcome #1: Students can recognize and articulate the need, type, scope, and utility of medical device technology, as well as the complex datasets generated and their application to the practice of precision medicine.
Concepts: imaging modalities and testing methods in clinical practice for diagnosis, evaluation methods, and role of AI in image reconstruction, interpretation, and decision-making
Competencies: ability to describe common diagnostic imaging modalities, explain development process of new diagnostic technology, articulate the role of AI in image reconstruction, interpretation, and decision-making
Assessment Methods: homework and team projects, embedded exam questions (direct), and student exit survey (indirect)
Measures: instructor grading of homework assignments, projects, quizzes and exams, responses to student exit survey
Learning Outcome #2: Students can recognize and articulate the need, type, scope and utility of Medical Biotechnology and Pharmaceutical technology/Industry.
Concepts:
Competencies:
Assessment Methods: embedded exam questions (direct), and student exit survey (indirect)
Measures: instructor grading of homework assignments, quizzes and exams, responses to student exit survey
Learning Outcome #3: Students can evaluate and recognize the application of commercialization, marketing and sales, communication, information conveyance and advertising the broad business space of Medical Devices, Biotechnology and Pharmaceutical Technology.
Concepts: financial and managerial accounting topics, microeconomics and macroeconomics, organizational behavior, human relations, ethical decision-making, innovation, corporate governance, and strategies in a global business environment
Competencies: ability to understand/prepare financial and managerial accounting reports, financial performance analysis, understanding of economic principles, business markets, innovation and development
Assessment Methods: homework and projects with real data, embedded exam questions (direct), and student exit survey (indirect)
Measures: instructor grading of homework assignments, projects and exams, responses to student exit survey
Learning Outcome #4: Students can evaluate and recognize the application of the fundamental regulatory, legal and governmental aspects applicable and operative in Medical Device Technology, Biotechnology and Pharmaceutical Technology.
Concepts: regulations and policies that govern healthcare systems, funding, advances in technology, HIPAA, privacy and security, and intellectual property
Competencies: identify and describe legal and regulatory requirements around funding, technology, cybersecurity and protection of data in healthcare settings, knowledge of patents and other forms of intellectual property
Assessment Methods: short papers and assignments, embedded exam questions (direct), and student exit survey (indirect)

ADDITIONAL INFORMATION FORM

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Measures: instructor grading of exams, papers and homework assignments, responses to student exit survey
Learning Outcome #5: Students can recognize and articulate 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.
Concepts: clinical problem-solving in medical cases, use of technology to diagnose and treat across a spectrum of organ and body systems
Competencies: ability to describe components of medical cases, recognize trustworthy resources for medical knowledge, identify technologies for diagnosis across different body systems
Assessment Methods: embedded exam questions (direct), and student exit survey (indirect)
Measures: instructor grading of exams, responses to student exit survey

*Explanation: **Concepts** are the topics that students will learn in the program. **Competencies** are the skills they will learn. A **learning outcome** is their ability to apply the skills to the topics, or to use the skills and the topics together, in an observable way. The **assessment method** is where students will demonstrate the learning outcome, and a **measure** is how data will be pulled from the assessment method. Include both a direct and indirect assessment method and measurement for each learning outcome. Competencies and the learning outcomes need to reflect higher level learning: consider using verbs from the Application, Analysis, Synthesis, and Evaluation columns from this list when writing learning outcomes: <https://arizona.app.box.com/s/orx6coex8607hlmenrql7dzhzjicpit>. We recommend 3-5 Learning Outcomes for a degree program.*

	BSM 101	BSM 305	BSM 441	PHCL 386	BSM 4**	ENTR 481A	ECON 200	ACCT 250	BNAD 302	BNAD 303	LAW 478A	LAW 479B	LAW 480B
LO #1: Students can recognize and articulate the need, type, scope, and utility of medical device technology, as well as the complex datasets generated and their application to the practice of precision medicine.		I/R	M			R							
LO #2: Students can recognize and articulate the need,		I			R/M								



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type, scope and utility of Medical Biotechnology and Pharmaceutical technology/Industry.													
LO #3: Students can evaluate and recognize the application of commercialization, marketing and sales, communication, information conveyance and advertising the broad business space of Medical Devices, Biotechnology and Pharmaceutical Technology.						M	I	I/R	R	R			
LO #4: Students can evaluate and recognize the application of the fundamental regulatory, legal and governmental aspects applicable and operative in Medical Device Technology, Biotechnology and	I			I							R	M	R



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ADDITIONAL INFORMATION FORM

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Pharmaceutical Technology.													
LO #5: Students can recognize and articulate 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.	I		M		M								

VII. PROGRAM ASSESSMENT PLAN-

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

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

5-YEAR PROJECTED ANNUAL ENROLLMENT



ADDITIONAL INFORMATION FORM

To be used once preliminary proposal has been approved.

	1 st Year	2 nd Year	3 rd Year	4 th Year	5 th Year
Number of Students	25	75	125	250	400

Data/evidence used to determine projected enrollment numbers:

The projected enrollment number is based on current student survey results, class size and faculty teaching loads. From up-and-coming graduates looking to kickstart their MDTD careers to experienced health technology professionals eager for their next challenge, the medical device technology development industry offers an abundance of opportunities for candidates at all stages of their careers. In the USA alone, the industry is responsible for the creation of over 2 million jobs, and given the unstoppable growth of innovative health technologies, it is likely that the sector will continue creating employment opportunities for the foreseeable future.

With the demand for medical technology professionals far outpacing demand, now is a better time than ever for high-quality graduates to pursue careers in MDTD. As well as excellent job prospects, MDTD candidates can expect relatively high salaries, the chance to make a positive difference to the world's well-being, and continuous challenges and advancement opportunities.

A rapidly aging population, the shift toward delivering in-home healthcare, and the increasing prevalence of diabetes, hypertension, and other chronic diseases are key developments expected to boost medical device sales in the next decade. Simultaneously, technological advances are revolutionizing the medical device industry, not only increasing the number of connected, patient-centric medical devices going to market but also strengthening their role in healthcare. The global medical devices market totaled \$489 billion in 2021 and may top \$500 billion in 2022. One estimate forecasts the market expanding to \$719 billion by 2029 — an annualized rate of 5.5% from 2022 to 2029.

References:

A unique medical device to tackle neonatologists' most critical needs. Retrieved from <https://www.strata.team/a-unique-medical-device-to-tackle-neonatologists-most-critical-needs/>

National Health Expenditures. Retrieved from <https://www.cms.gov/data-research/statistics-trends-and-reports/national-health-expenditure-data>

Cohen, I. G., Minssen, T., Price, W. N., Robertson, C. T., & Shachar, C. (Eds.). (2022). Innovation and protection: the future of medical device regulation. Cambridge University Press.

U.S. Bureau of Labor Statistics. Occupational Outlook Handbook. Healthcare Occupations. Retrieved from <https://www.bls.gov/ooh/healthcare/home.htm> (updated September 6, 2023)

IX. ANTICIPATED DEGREES AWARDED-



ADDITIONAL INFORMATION FORM

To be used once preliminary proposal has been approved.

PROJECTED DEGREES AWARDED ANNUALLY					
	1 st Year	2 nd Year	3 rd Year	4 th Year	5 th Year
Number of Degrees	NA	10	50	100	200

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

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

Appendix A. Minor Requirements. N/A

Appendix B. Emphasis Print Information-

Emphasis	Print on transcript	Print on diploma
Medical Technology - Device	Yes	Yes
Medical Technology – Biotech/Pharma	Yes	Yes
Medical Technology – Business and Marketing/Media	Yes	Yes
Medical Technology – Regulatory-Law-Government	Yes	Yes
Basic and Clinical Medical Sciences	Yes	Yes



BUDGET PROJECTION FORM

Name of Proposed Program or Unit: Bachelor of Sciences in Medical Device and Technology Development

Budget Contact Person: Jason Marr	Projected		
	1st Year 2025 - 2026	2nd Year 2026 - 2027	3rd Year 2027 - 2028
METRICS			
Net increase in annual college enrollment UG	25	75	125
Net increase in college SCH UG	825	2,450	4,025
Number of Faculty FTE	0.40	0.40	0.40
FUNDING SOURCES			
Continuing Sources			
UG AIB Revenue	164,675	489,300	804,475
Grad AIB Revenue			
Program Fee Revenue (net of revenue sharing)			
F and A AIB Revenues			
Reallocation from existing College funds (attach description)			
Other Items (attach description)			
Total Continuing	\$ 164,675	\$ 489,300	\$ 804,475
One-time Sources			
College fund balances	246,000		
Institutional Strategic Investment			
Gift Funding			
Other Items (attach description)			
Total One-time	\$ 246,000	\$ -	\$ -
TOTAL SOURCES	\$ 410,675	\$ 489,300	\$ 804,475
EXPENDITURE ITEMS			
Continuing Expenditures			
Faculty	115,430	117,739	120,093
Other Personnel	174,000	177,480	181,030
Employee Related Expense	92,618	94,470	96,359
Graduate Assistantships			
Other Graduate Aid			
Operations (materials, supplies, phones, etc.)	3,000	3,000	3,000
Additional Space Cost			
Other Items (attach description)			
Total Continuing	\$ 385,048	\$ 392,689	\$ 400,482
One-time Expenditures			
Construction or Renovation	25,000		
Start-up Equipment			
Replace Equipment			
Library Resources			
Other Items (attach description)			
Total One-time	\$ 25,000	\$ -	\$ -
TOTAL EXPENDITURES	\$ 410,048	\$ 392,689	\$ 400,482
Net Projected Fiscal Effect	\$ 627	\$ 96,611	\$ 403,993

Expenses

Title	FTE	Salary	Role (gross)	ERE
Director	0.30	\$ 350,600	\$ 105,180	\$ 33,658
Assoc Director	0.10	\$ 102,500	\$ 10,250	\$ 3,280
Program Coordinator	1.00	\$ 65,000	\$ 65,000	\$ 20,800
Administrative Assistant	1.00	\$ 54,000	\$ 54,000	\$ 17,280
Advisor	1.00	\$ 55,000	\$ 55,000	\$ 17,600
Total			\$ 289,430	\$ 92,618

1 lab, 600-800 sq ft
 1 Anteroom, 200 sq ft
 2 Offices, 300-400 sq ft
 1 storage space

AIB Revenue

	Yr1	Yr2	Yr3
Projected Enrollment	25	75	125
\$ / enrollment	\$ 350	\$ 350	\$ 350
Enrollment Revenue	\$ 8,750	\$ 26,250	\$ 43,750

COM-T Only:

	Yr1	Yr2	Yr3
Projected SCH	50	550	1,375
\$ / SCH	\$ 189	\$ 189	\$ 189
SCH Revenue	\$ 9,450	\$ 103,950	\$ 259,875

All:

	Yr1	Yr2	Yr3
Projected SCH	825	2,450	4,025
\$ / SCH	\$ 189	\$ 189	\$ 189
SCH Revenue	\$ 155,925	\$ 463,050	\$ 760,725

All AIB Revenue:

\$ 164,675	\$ 489,300	\$ 804,475
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Total net tuition / UG student		\$	6,977		
Total UA Tuition Revenue, net	\$	174,414	\$	523,243	\$ 872,072
Housing	\$	30,000	\$	90,000	\$ 150,000
Student Union	\$	12,500	\$	37,500	\$ 62,500
Campus Health	\$	2,500	\$	7,500	\$ 12,500
Bookstores	\$	12,500	\$	37,500	\$ 62,500
Parking	\$	7,500	\$	22,500	\$ 37,500
Total auxiliary	\$	65,000	\$	195,000	\$ 325,000
Total UA Revenue	\$	239,414	\$	718,243	\$ 1,197,072

Total Cost

\$ 138,838

\$ 13,530

\$ 85,800

\$ 71,280

\$ 72,600

\$ 382,048 Annual, ongoing

\$ - One-time

	\$ / Student	
Housing	\$	1,200
Student Union	\$	500
Campus Health	\$	100
Bookstores	\$	500
Parking	\$	300

YEAR 1 FALL SEMESTER	
ENGL 101 First-Year Composition I <i>OR</i> ENGL 109H	
MATH 112 College Algebra	
BSM 101 Intro to Medicine	
General Education- Building Connections Option*	
Foreign Language	
UNIV 101- General Education	
	Total Units
YEAR 2 FALL SEMESTER	
PHYS 102 Physics I Lecture	
PHYS 181 Physics I Lab	
ECOL 182R Intro to Biology II Lecture	
ECOL 182L Intro to Biology II Lab	
General Education- Exploring Humanist*	
ACCT 250 Survey of Accounting (Info for Business Decisions)	
BME 295C Challenges in Biomedical Engineering	
	Total Units
YEAR 3 FALL SEMESTER	
PSIO 202 Human Anatomy & Physiology II	
MED 441 Diagnostic Technologies and Their Role in Healthcare	
PHCL 386 Intro to Tech Transfer in Medicine	
General Education- Exploring Artist*	
BNAD 302 Human Side of Organization	
	Total Units
YEAR 4 FALL SEMESTER	
ECON 427 - Current Topics in Healthcare Economics and Policy	
LAW 478A Legal & Regulatory Aspects for Health Care Delivery	
LAW 479B Legal & Regulatory Fundamentals of Health Care Business	
Medical Emphasis Elective **	
	Total Units
TOTAL UNITS REQUIRED (w/ only 12 units emphasis)	

RED = MDTD Core courses

12 units in Medical Emphasis Electives

6 general electives (encourage internships and/or research-hands-on)

Units	YEAR 1 SPRING SEMESTER
3	ENGL 102 First-Year Composition II <i>OR</i> ENGL 109H
3	CHEM 130
2	CHEM130L
3	MCB 181R Intro to Biology I Lecture
4	MCB 181L Intro to Biology I Lab
1	MATH 163/263, SBS 200, BME 376 or AREC 239 Statistics
	ECON 200 Basic Economic Issues
16	Total Units
Units	YEAR 2 SPRING SEMESTER
3	Medical Emphasis Elective**
1	General Education- Building Connections Option*
3	BSM 305 Introduction to Medical Devices, Technologies, Biotech and Pharma
1	PHYS 103 Physics II Lecture
3	PHYS 182 Physics II Lab
3	PSIO 201 Human Anatomy & Physiology I
1	
15	Total Units
Units	YEAR 3 SPRING SEMESTER
4	BNAD 303 Marketing Principles, Concepts, and Tools
3	MED 481A Innovation, Translation and Entrepreneurship
3	LAW 480B Data Privacy & Cybersecurity in Health Care
3	General Education- Building Connections Option*
3	BSM 4** Med Device, Biotech Pharma Hands on Exposure & CLinical Applications
	UNIV 301- General Education- Capstone E-Portfolio
16	Total Units
Units	YEAR 4 SPRING SEMESTER
3	Medical Emphasis Elective**
3	Medical Emphasis Elective**
3	General Elective **
3	General Elective**
12	Total Units
120	

Units
3
3
1
3
1
3
3
17

Units
3
3
3
3
1
4
17

Units
3
2
3
3
3
1

15
Units
3
3
3
3

12

Auxiliary Units**External Revenue**

Housing & Res Life
Per FTE

Student Union
Per FTE

Campus Health
Per FTE

Campus Rec
Per FTE

BookStores
Per FTE

Parking & Transportation
Per FTE

Fees

Mandatory Fees
Per FTE

Misc Fees
Per FTE

Study Abroad

FY15**FY16**

39,167,700
924

40,128,833
926

17,513,400
413

18,652,192
431

Student FTE Fall Census

42,388.1

43,323.1

FY17	FY18	FY19	FY20	FY21
		53,419,419	55,136,853	43,291,763
		1,204	1,233	951
		29,430,979	25,048,474	12,100,158
		663	560	266
		7,613,415	6,865,399	5,244,664
		172	154	115
		2,217,036	1,369,205	722,265
		50	31	16
		26,478,915	21,949,754	16,409,454
		597	491	361
		18,054,646	16,468,812	10,098,958
		407	368	222
39,898,700	43,915,500	46,880,200	49,585,161	50,682,663
916	995	1,056	1,109	1,113
19,324,900	21,135,900	21,927,900	20,020,617	20,136,577
444	479	494	448	442
	11,709,916	9,974,847	3,995,405	1,376,761
	265	225	89	30
43,570.1	44,128.9	44,375.9	44,713.7	45,516.7

FY22	Planning Assumption
62,904,555 1,343	1,200
28,034,608 599	500
5,804,582 124	100
1,791,782 38	-
20,830,130 445	500
17,288,017 369	300
52,559,321 1,122	1,100
23,466,650 501	500
8,791,552 188	100
46,828.7	



New Academic Program PEER COMPARISON

Program name, degree, and institution	Medical Device Technology Development, Bachelor of Science, University of Arizona	BS in Health Entrepreneurship and Innovation, Bachelor of Science, Arizona State University, Edson College of Nursing and Health Innovation	BS in Health Technology, Bachelor of Science, University of Illinois at Urbana-Champaign (UIUC)	BS in Health Services Management, Bachelor's of Science, University of Minnesota
Current number of students enrolled		17 new students in Fall 2024	45 in concentration	208 in the major 227 in major/minor combined
Program Description	The Bachelor of Science in Medical Device and Technology Development (MDTD) is a four-year degree program designed and delivered as a collaboration between clinicians, basic scientists, engineering, business and law, with focus on learning about the medical field devices and technology that would offer students multiple avenues upon graduation. The program would allow	The BS program in health entrepreneurship and innovation provides a broad background in the principles of innovation, leadership, complexity science, change theory, collaboration and evidence-based decision-making to ensure that its graduates are prepared to manage implementation of innovation in the health care arena. Through the use of evidence-based decision-making and leadership skills in interprofessional teams, students learn to tackle health care challenges using	Develop the skills and knowledge needed to implement and support information technology solutions for health sector organizations. Coursework will focus on the areas of health information management including health information processing and exchange, health care analytics, enterprise management, and information storage and security management.	Health services managers direct, plan, or coordinate medical and health services in hospitals, clinics, managed care or health insurance companies, pharmaceutical or medical device organizations, long term care facilities, public health agencies, and many more. Health services managers are the business leaders who help run these organizations, working to improve access and delivery of healthcare services.

	<p>students to learn the basics in the medical health field while expanding into areas of interest that would include the business of medical devices, creating/engineering of devices as well as the legal/regulatory components of medical devices. The program juxtaposes applied topics such as what it is to be an individual that helps develop medical devices, or goes into the sales or use of devices, works in the regulatory fields of medical devices and/or goes onto professional degree programs that allows one to utilize such devices in their health care field. The rapidly growing field of medical devices and the MDTD BS program would allow for hands-on experience through simulation in addition to information</p>	<p>modern technology, public policy and communication. This unique program situates students at the intersection of innovation and entrepreneurship, enabling them to develop their own solutions to health challenges.</p>		
--	---	---	--	--

	delivered in the classroom setting.			
Target Careers	Biomedical Engineer, Clinical Informationist, Medical Device Designer, Healthcare Data Analyst, Telemedicine Specialist, Health IT Consultant	entrepreneurs health architects health care administrators health care strategists, advisors, project managers and administrators health innovation consultants health product and service managers health system designers intrapreneurs --- managers responsible for promoting innovative product development and marketing public relations experts in health	Many pursue a pre-health path post-graduation Some consider the Health Tech Masters Program	Medical Office / Clinic Manager Healthcare Data Analyst Medical and Pharmaceutical Sales Healthcare Operations Manager Patient/Client Care Coordinator Quality & Patient Safety Manager Healthcare Project Manager Long-Term Care Administrator Client Services Specialist Account Manager Health System Manager Patient Access Supervisor Health Insurance Analyst Human Resources Generalist Digital Client Services Manager Admissions Supervisor Healthcare Consultant Business Office Manager Accounting / Billing Systems Specialist
Emphases? (Yes/No) List, if applicable	Yes 1. Medical Technology – Device	No, but has associated accelerated masters	This degree is a concentration within the	No. Minor and Certificate programs available.

	2. Medical Technology – Biotech/Pharma 3. Medical Technology – Business and Marketing/Media 4. Medical Technology – Regulatory-Law-Government 5. Basic and Clinical Medical Sciences	programs in Aging and Healthcare Innovation	Interdisciplinary Health Sciences Degree	
Minimum # of units required	120	120	128	120
Level of Math required	Moderate: College Algebra or higher along with statistics	College Mathematics Math Intensity: General	Biostatistics	Introduction to Statistics
Level of Second Language required	2 nd semester proficiency	Not required	3 rd semester second language	Not required
Special requirements to declare/gain admission?	No	No	No	30 transferable credits 2.5+ GPA Demonstrated interest in HSM field
Internship, practicum, or applied/experiential requirements? If yes, describe.	Not required. Internship opportunities may be available.	Not required. Internship opportunities are available though.	Yes, an internship is required for Interdisciplinary Health Sciences degree.	Yes, Health Services Management Internship Leadership and Business Planning in Health Care - Capstone

Additional questions:

1. How does the proposed program align with peer programs? Briefly summarize the similarities between the proposed program and peers, which could include curriculum, overall themes, faculty expertise, intended audience, etc.

All programs have a focus on understanding the function of medical devices. The MS degree from University of Minnesota and the BS degree from New Jersey Technical Institute share a focus on design, innovation and development with the proposed MDTD program. Target careers for the three programs share significant overlap with the proposed MDTD program.

2. How does the proposed program stand out or differ from peer programs? Briefly summarize the differences between the proposed program and peers, which could include curriculum, overall themes, faculty expertise, intended audience, etc.

The truly unique aspect of the proposed MDTD program is that it has a lower math requirement, requiring only College Algebra and statistics. The other programs require some form of Calculus, as does the Biomedical Engineering degree at UA. The MDTD program has some exposure to biomedical engineering and an additional focus on regulation, policy, physiology, and business. The only peer program that shares those additional subjects is the Master's degree from University of Minnesota.

At the University of Arizona, the BS in Medicine prepares graduates for medical school, graduate programs in allied health, or careers in clinical care, whereas the BS MDTD degree program aims to immediately prepare students for the workforce, does not require biochemistry, and allows students to pursue a multidisciplinary curriculum steeped in courses across several colleges at the University of Arizona while limiting the prerequisites and co-requisites required to complete the degree.

3. How do these differences make this program more applicable to the target student population and/or a better fit for the University of Arizona?

This degree provides opportunity for a non-math broad focused major in device development creating an alternate path for students to access the field of medical device technology. The variety of topics introduced in this major help to address the concepts with which biological technicians/technologists often struggle, e.g. strategy, financing, proof of concept, intellectual property, drug discovery, and policy.



McClelland Hall 417
1130 E. Helen Street
P.O. Box 210108
Tucson, AZ 85721-0108
Ofc: 520-621-2125
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March 1, 2024

Marvin Slepian, M.D.
Regents Professor of Medicine – Division of Cardiology
Regents Professor and Associate Department Head – Biomedical Engineering
University of Arizona College of Medicine – Tucson

Dear Marvin:

In my role as Dean of Eller College of Management, I am writing this letter in strong support of the College of Medicine-Tucson proposal for a new Bachelor of Science in Medical Device Technology Development.

This new Bachelor of Science in Medical Device Technology Development degree will help grow the overall number of students coming to University of Arizona as well as those enrolling on-line. In addition, several Colleges/Departments/Center faculty members are leaders in their fields and are uniquely qualified to contribute to the program. The proposed program emanates from a partnership between the College of Engineering, James E. Rogers College of Law, Eller College of Management, College of Medicine Tucson, University of Arizona Health Sciences and Tech Launch Arizona.

Also, as we launch the Comprehensive Education Core, the BS in Medical Device Technology Development that will utilize the infrastructure to accommodate growth and provide students the support they need to be successful throughout their educational journeys.

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

With regards,

A handwritten signature in blue ink, reading 'K. Karthik Kannan'.

Karthik Kannan
Dean and Halle Chair in Leadership
Eller College of Management
University of Arizona

COLLEGE OF ENGINEERING

Office of the Dean
1209 E. 2nd Street, Room 100
Tucson, AZ 85721-0072

Office: 520-621-6595
engineering.arizona.edu



THE UNIVERSITY OF ARIZONA

College of Engineering

November 14, 2024

To: Dean Michael Abecassis, College of Medicine - Tucson

From: David W. Hahn, Craig M. Berge Dean, College of Engineering 

Subject: Medical Device Technology Development

This memo is to express College of Engineering full support for your new proposed BS degree program Medical Device Technology Development (MDTD). Engineering looks forward to future collaborations and identification of synergy between the MDTD program and existing engineering programs, including Biomedical Engineering, Systems Engineering, and Electrical and Computer Engineering to name a few.





The University of Arizona
Health Sciences

Office of the
Senior Vice
President for Health
Sciences

Phoenix Campus
435 North 5th Street
Executive Suite
Phoenix, AZ 85004-
2230

Tucson Campus
1670 E. Drachman
PO Box 210216
Tucson, AZ 85721-0216
Tel: (520) 626-1197
Fax: (520) 626-1460

February 23, 2024

Marvin Slepian, M.D.

Regents Professor of Medicine – Division of Cardiology

Regents Professor and Associate Department Head – Biomedical Engineering

University of Arizona College of Medicine – Tucson

Dear Marvin:

I am excited to hear about the proposed launch of a new Bachelor of Science in Medical Device Technology Development. The new degree will offer students additional opportunities within the health sciences and meets the needs of a rapidly growing industry. As with any expanding industry, educational pathways that can help students move into the field will be very valuable to employers and sought after by students.

Not only will this degree help grow overall enrollment in a new and dynamic field of study, it also positions graduates to meet the challenges of the future in health care technology. The forward-thinking curriculum will prepare students to enter a fast-changing landscape by providing them with the interprofessional perspective necessary to be successful. This interprofessional partnership between four existing UA colleges, the University of Arizona Health Sciences and Tech Launch Arizona creates a unique opportunity for students by leveraging existing courses and resources.

I strongly support the launch of this program as an addition to the offerings of the College of Medicine – Tucson where it will be well positioned with access to research, clinical and other medical faculty and professionals. The college's history of excellent academic support for students will be key in ensuring their success as this new program ramps up.

Sincerely,

Michael D. Dake, MD

Senior Vice President for Health Sciences

University of Arizona



THE UNIVERSITY OF ARIZONA
James E. Rogers
College of Law

DEAN'S OFFICE

James E Rogers College of Law
1201 E Speedway Blvd
PO Box 210176
Tucson AZ 85721-0176
520-621-1498 / law.arizona.edu

November 9, 2024

Marvin Slepian, M.D.
Regents Professor of Medicine – Division of Cardiology
Regents Professor and Associate Department Head – Biomedical Engineering
University of Arizona College of Medicine – Tucson

Dear Marvin,

As Dean of the James E. Rogers College of Law, I strongly support the College of Medicine-Tucson proposal for a new Bachelor of Science in Medical Device Technology Development.

This new Bachelor of Science in Medical Device Technology Development degree will help grow the overall number of students coming to University of Arizona as well as those enrolling on-line. The proposed program aligns well with existing undergraduate courses, including several in our James E. Rogers College of Law Health Law & Policy Program that will be offered as part of the new degree. These courses, include:

LAW 480B: Data Privacy and Cybersecurity in Healthcare
LAW 478A: Legal & Regulatory Aspects for Healthcare Delivery
LAW 479B: Legal & Regulatory Fundamentals of Healthcare Business

There is an urgent need to provide educational pathways to students that leverage existing courses in novel ways and provide much needed enrollment opportunities. The new Bachelor of Science in Medical Device Technology Development degree addresses this need and offers a unique learning experience that will prepare future students for careers in this growing sector of the healthcare industry.

Sincerely,

Marc L. Miller
Dean and Ralph W. Bilby Professor of Law





McClelland Hall 417
1130 E. Helen Street
P.O. Box 210108
Tucson, AZ 85721-0108
Ofc: 520-621-2125
eller.arizona.edu

March 1, 2024

Marvin Slepian, M.D.
Regents Professor of Medicine – Division of Cardiology
Regents Professor and Associate Department Head – Biomedical Engineering
University of Arizona College of Medicine – Tucson

Dear Marvin:

In my role as Dean of Eller College of Management, I am writing this letter in strong support of the College of Medicine-Tucson proposal for a new Bachelor of Science in Medical Device Technology Development.

This new Bachelor of Science in Medical Device Technology Development degree will help grow the overall number of students coming to University of Arizona as well as those enrolling on-line. In addition, several Colleges/Departments/Center faculty members are leaders in their fields and are uniquely qualified to contribute to the program. The proposed program emanates from a partnership between the College of Engineering, James E. Rogers College of Law, Eller College of Management, College of Medicine Tucson, University of Arizona Health Sciences and Tech Launch Arizona.

Also, as we launch the Comprehensive Education Core, the BS in Medical Device Technology Development that will utilize the infrastructure to accommodate growth and provide students the support they need to be successful throughout their educational journeys.

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

With regards,

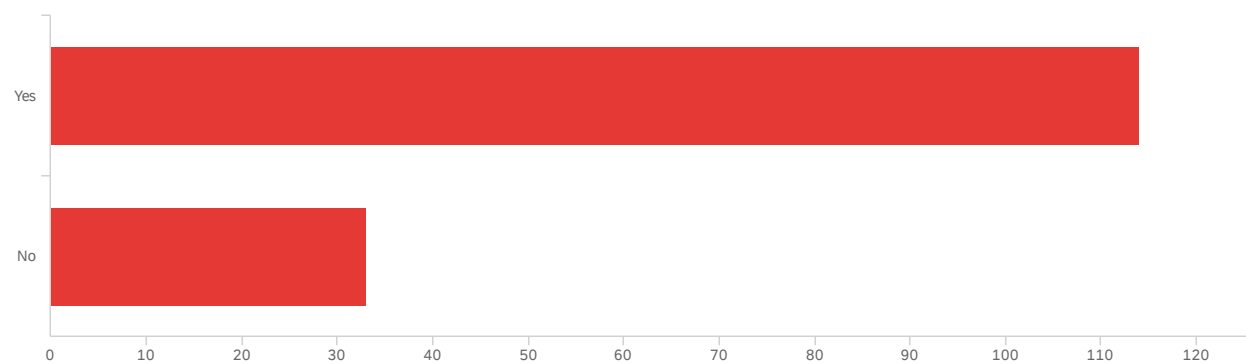
A handwritten signature in blue ink, reading 'K. Karthik Kannan'.

Karthik Kannan
Dean and Halle Chair in Leadership
Eller College of Management
University of Arizona

Default Report

Bachelor of Science Degree Program in Medical Device Technology Development (MDTD) Interest Survey
February 15, 2024 11:16 AM MST

Q1 - Do you have any interest in learning more about medical devices and how they are used, developed, marketed, sold, etc.?



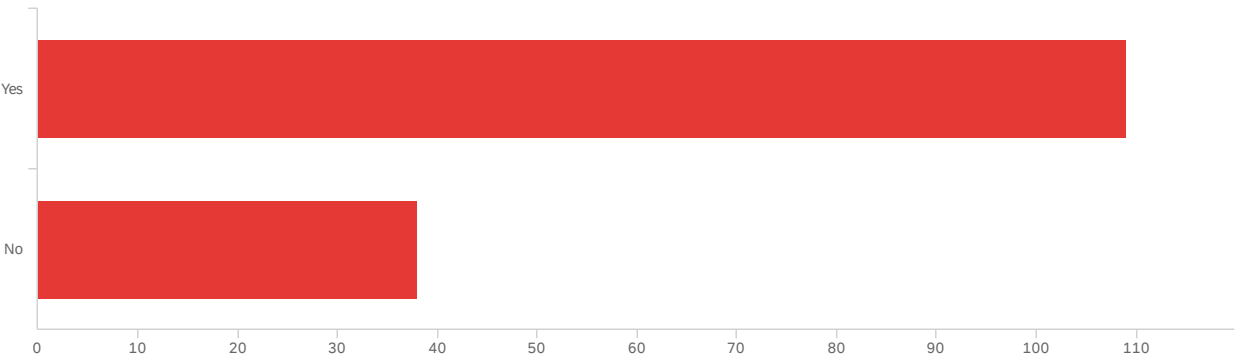
#	Field	Minimum	Maximum	Mean	Std Deviation	Variance	Count
1	Do you have any interest in learning more about medical devices and how they are used, developed, marketed, sold, etc.?	1.00	2.00	1.22	0.42	0.17	147

#	Field	Choice	Count
1	Yes	77.55%	114
2	No	22.45%	33

147

Showing rows 1 - 3 of 3

Q2 - Do you have any interest in learning more about pharma/drug technologies and biotech?



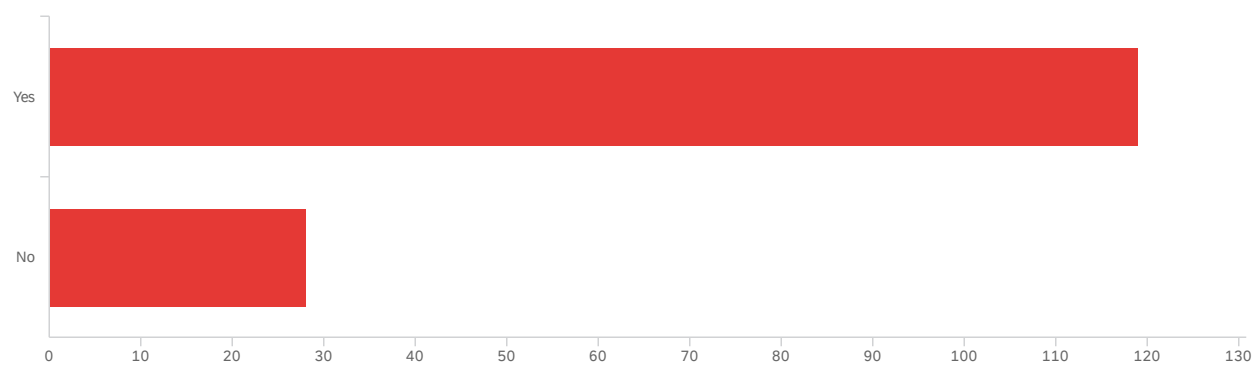
#	Field	Minimum	Maximum	Mean	Std Deviation	Variance	Count
1	Do you have any interest in learning more about pharma/drug technologies and biotech?	1.00	2.00	1.26	0.44	0.19	147

#	Field	Choice	Count
1	Yes	74.15%	109
2	No	25.85%	38

147

Showing rows 1 - 3 of 3

Q3 - If the College of Medicine offered courses on medical devices, pharma and biotech that were non-technical, with no advanced math requirement, would you register for the courses?



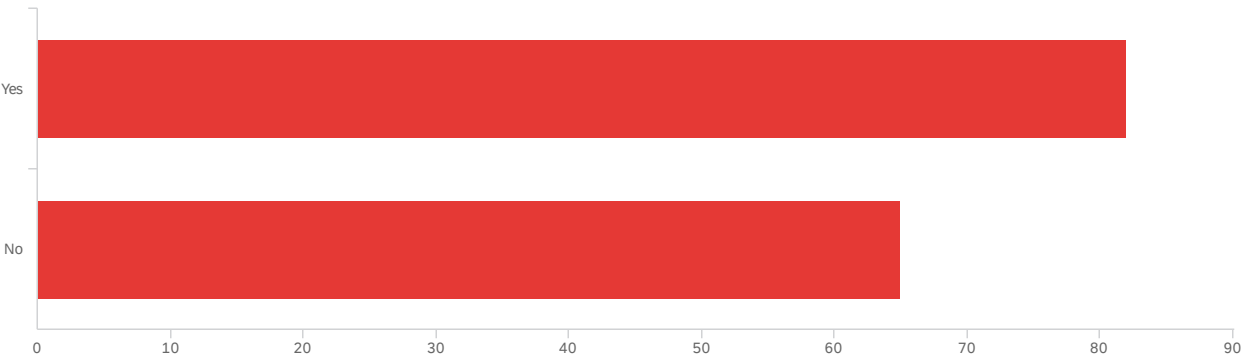
#	Field	Minimum	Maximum	Mean	Std Deviation	Variance	Count
1	If the College of Medicine offered courses on medical devices, pharma and biotech that were non-technical, with no advanced math requirement, would you register for the courses?	1.00	2.00	1.19	0.39	0.15	147

#	Field	Choice Count
1	Yes	80.95% 119
2	No	19.05% 28

147

Showing rows 1 - 3 of 3

Q5 - If a degree or a minor was available in medical device technology and development
would you be interested?



#	Field	Minimum	Maximum	Mean	Std Deviation	Variance	Count
1	If a degree or a minor was available in medical device technology and development would you be interested?	1.00	2.00	1.44	0.50	0.25	147

#	Field	Choice	Count
1	Yes	55.78%	82
2	No	44.22%	65

147

Showing rows 1 - 3 of 3

Monday, December 9, 2024 at 11:22:40 Mountain Standard Time

Subject: RE: Classes for Proposed New Major
Date: Tuesday, October 22, 2024 at 1:59:14 PM Mountain Standard Time
From: Sorensen, Ronald Duane - (rdsorensen)
To: Phillips, Brandon - (phillipsb), Urquidez, Celina B - (celinau)
Attachments: image001.png, image002.png

Hello Brandon,

I've reached out to all the faculty teaching the courses you have listed in your email below. They are fine with having the courses listed as electives in the new undergraduate major in Medical Device Technology Development.

Thank you,

Ron

From: Phillips, Brandon - (phillipsb) <phillipsb@arizona.edu>
Sent: Wednesday, October 2, 2024 1:54 PM
To: Sorensen, Ronald Duane - (rdsorensen) <rdsorensen@arizona.edu>; Urquidez, Celina B - (celinau) <celinau@arizona.edu>
Subject: Classes for Proposed New Major

Hi Ron and Celina,

I have been assisting with the proposal for a new undergraduate major in Medical Device Technology Development, and we have selected numerous courses to be included as emphasis electives. Some of these are from FCM. I was hoping you could let me know if FCM would approve of their use as emphasis electives in this new MDTD program.

The courses are:

- FCM 302 Clinical Health Disparities in Sexual and Gender Minority (SGM) Populations (3 units)
- FCM 402/502 Addressing Health Disparities through Interprofessional Clinical-Community Collaboration (3 units)

I know 302 and 402 have not been active recently, but if you think they will be offered in the future, we would still like to include them.

- FCM 424/524 Arts and Community Health Intercultural Perspectives and Applications Parts I-III (1-3 units)
- FCM 410/510 Substance Misuse in Maternal and Child Health Populations (3 units)
- FCM 496A Advancements in Substance Misuse Research and Clinical Care Seminar (2 units)
- FCM 498 Community Health Field Training Experience (2 units)

Please let me know if we can use these courses to help build the emphases. Feel free to reach out if you need more information. We are hoping to get your approval by the end of October because this proposal is moving on to next steps very soon.

Subject: Re: Classes for Proposed New Major
Date: Friday, October 18, 2024 at 12:41:25 PM Mountain Standard Time
From: Kiehlbaugh, Kasi - (kkiehlbaugh)
To: Phillips, Brandon - (phillipsb), Ehiri, John E - (jehiri), Embry, Danielle M - (dembry)
CC: Peters, Matt - (mwpeters)
Attachments: image003.png, image001.png, image002.png

Brandon,

I am writing to approve the use of HSD 401, HSD 410, and HSD 420 in the MDTD program. I would also like to recommend that you include our newly approved course, HSD 415, as well.

HSD 415: Design Visualization Practices for Health: From Speculations to Resolutions (3 units)
<https://catalog.arizona.edu/courses/0434181>

Warmly,
Kasi

Kasi M. Kiehlbaugh, PhD | she/her
pronunciation: "KAY-see KEEL-bah"
Director, [Health Sciences Design](#)
University of Arizona Health Sciences, [HSIB 615](#)
Assistant Professor of Practice, Biomedical Engineering
Executive Committee Chair, [Vertically Integrated Projects](#)
[520-621-0539](tel:520-621-0539) (office) | [520-261-1553](tel:520-261-1553) (cell) | [306604](tel:306604) (Zoom Phone) | kkiehlbaugh@arizona.edu

From: Phillips, Brandon - (phillipsb) <phillipsb@arizona.edu>
Sent: Thursday, October 3, 2024 1:06 PM
To: Ehiri, John E - (jehiri) <jehiri@arizona.edu>; Embry, Danielle M - (dembry) <dembry@arizona.edu>
Cc: Kiehlbaugh, Kasi - (kkiehlbaugh) <kkiehlbaugh@arizona.edu>; Peters, Matt - (mwpeters) <mwpeters@arizona.edu>
Subject: Re: Classes for Proposed New Major

Thank you, John!



Brandon Phillips
Program Coordinator, Senior
Bachelor of Science in Medicine
College of Medicine
THE UNIVERSITY OF ARIZONA

Arizona Health Sciences Center
1119
[Land Acknowledgment](#)
www.arizona.edu

The University of Arizona Purpose & Values:

Working together to expand human potential,
explore new horizons and enrich life for all.

Integrity • Compassion • Exploration
Adaptation • Inclusion • Determination

From: Ehiri, John E - (jehiri) <jehiri@arizona.edu>

Date: Thursday, October 3, 2024 at 1:03 PM

To: Embry, Danielle M - (dembry) <dembry@arizona.edu>, Phillips, Brandon - (phillipsb) <phillipsb@arizona.edu>

Cc: Kiehlbaugh, Kasi - (kkiehlbaugh) <kkiehlbaugh@arizona.edu>, Peters, Matt - (mwpeters) <mwpeters@arizona.edu>

Subject: RE: Classes for Proposed New Major

Hi Brandon,

I approve the inclusion of PHP 205, PHPM 310, and HPS 433 in your new MDTD program.

Best wishes,
John



John Ehiri, PhD

Professor

Senior Associate Dean for Academic and Faculty Affairs

Mel and Enid Zuckerman College of Public Health

THE UNIVERSITY OF ARIZONA

Roy P. Drachman Hall, A317H

1295 N Martin Ave | Tucson, AZ 85721

Office: 520-626-1355

jehiri@arizona.edu

publichealth.arizona.edu

From: Embry, Danielle M - (dembry) <dembry@arizona.edu>

Sent: Thursday, October 3, 2024 10:03 AM

To: Phillips, Brandon - (phillipsb) <phillipsb@arizona.edu>

Cc: Ehiri, John E - (jehiri) <jehiri@arizona.edu>; Kiehlbaugh, Kasi - (kkiehlbaugh) <kkiehlbaugh@arizona.edu>; Peters, Matt - (mwpeters) <mwpeters@arizona.edu>

Subject: RE: Classes for Proposed New Major

Good morning Brandon.

Thanks for reaching out. Sounds like an interesting new major! I am copying our Sr. Associate Dean for Academic Affairs, Dr. John Ehiri, here for approval to list PHP 205, PHPM 310 and HPS 433 in your new MDTD program.

The HSD classes will soon be transferred to the College of Health Sciences. I'm looping in the Director of Health Sciences Design, Dr. Kasi Kiehlbaugh, for approval to list HSD 401, HSD 410, and HSD 420.

Best,
Danielle

From: Phillips, Brandon - (phillipsb) <phillipsb@arizona.edu>
Sent: Wednesday, October 2, 2024 1:48 PM
To: Embry, Danielle M - (dembry) <dembry@arizona.edu>
Subject: Classes for Proposed New Major

Hi Danielle,

I have been assisting with the proposal for a new undergraduate major in Medical Device Technology Development, and we have selected numerous courses to be included as emphasis electives. Some of these are in your purview. I was hoping you could let me know if these programs would approve of their use as emphasis electives in this new MDTD program.

The courses are:

- PHP 205 Fundamentals of Telehealth (3 units)
- HSD 401 Design for Health Workshop: Addressing Human Health Challenges with Design Thinking (Gen Ed Building Connections) (3 units)
- HSD 410 Device Design in the Health Sciences: Developing Tools for Health Care Solutions using Design Thinking (3 units)
- HSD 420 Healthy Design Practices: From the Makerspace to the Community (3 units)
- PHPM 310 Health Care in the U.S. (3 units)
- HPS 433 Global Health (3 units)

Please let me know if we can use these courses to help build the emphases. Feel free to reach out if you need more information. We are hoping to get approval by the end of October because this proposal is moving on to next steps very soon.

Thank you,



Brandon Phillips
Program Coordinator, Senior
Bachelor of Science in Medicine
College of Medicine
THE UNIVERSITY OF ARIZONA

Arizona Health Sciences Center
1119

[Land Acknowledgment](#)

www.arizona.edu

[Facebook](#) | [X \(formerly twitter\)](#) | [Instagram](#) | [LinkedIn](#)

Subject: Re: Classes for Proposed New Major
Date: Thursday, October 3, 2024 at 4:58:26 PM Mountain Standard Time
From: Wilson, Diana K - (dwilson)
To: Phillips, Brandon - (phillipsb)
Attachments: image001.png, image002.png

Hi Brandon,

Thanks for reaching out. I talked with our undergrad faculty:

BME 295C is open to all majors so that one is fine.

BME 486 - Dr. Kim said that one can work

BME 477 - Dr. Subbian said no on that one due to needing higher level engr/stats + coding skills

Would you be able to send a copy of the four year plan going into the proposal when you get a chance? When does this go up for a vote with Faculty Senate and ABOR?

Best, Diana

Diana Wilson, M.A. *She, her, hers*
Senior Academic Advisor
Engineering Bldg., 112D
520-621-5420

Please use this link to make an appointment:
<https://trellis.arizona.edu/solutions/trellis-advise>
Zoom: <https://arizona.zoom.us/my/bmediana>

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This too shall pass

From: Phillips, Brandon - (phillipsb) <phillipsb@arizona.edu>
Sent: Wednesday, October 2, 2024 1:58 PM
To: Wilson, Diana K - (dwilson) <dwilson@arizona.edu>
Subject: Classes for Proposed New Major

Hi Diana,

I have been assisting with the proposal for a new undergraduate major in Medical Device Technology Development, and we have selected numerous courses to be included as emphasis electives. Some of these are from BME. I was hoping you could let me know if BME would approve of their use as emphasis electives in this new MDTD program.

The courses are:

- BME 295C Challenges in Biomedical Engineering (1 unit)
- BME 477 Introduction to Bioinformatics (*instru consent reqd*) (3 units)
- BME 486 Biomaterial-Tissue Interactions (3 units)

Please let me know if we can use these courses to help build the emphases. Feel free to reach out if you need more information. We are hoping to get your approval by the end of October because this proposal is moving on to next steps very soon.

Thank you,



Brandon Phillips

Program Coordinator, Senior
Bachelor of Science in Medicine
College of Medicine
THE UNIVERSITY OF ARIZONA

Arizona Health Sciences Center
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Subject: Re: PHCL Courses in MDTD
Date: Wednesday, December 11, 2024 at 10:16:51 AM Mountain Standard Time
From: Phillips, Brandon - (phillipsb)
To: Vanderah, Todd W - (vanderah)
Attachments: image001.png, image002.png, image003.png, image004.png

Yes, that's the PHCL 386 in the core.



Brandon Phillips
Program Coordinator, Senior
Bachelor of Science in Medicine
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From: Vanderah, Todd W - (vanderah) <vanderah@arizona.edu>
Date: Wednesday, December 11, 2024 at 10:16 AM
To: Phillips, Brandon - (phillipsb) <phillipsb@arizona.edu>
Subject: Re: PHCL Courses in MDTD

Hi Brandon,

Yes, all good for the MDTD program

We also want to make sure Doug and Rakhi's course is available - I forget their number but it is a PHCL course.

Todd

Todd W. Vanderah
Regents Professor and Head
Department of Pharmacology

Co-Director of the MD/PhD Program
University of Arizona, COM-T
Director of the Comprehensive Center for Pain and Addiction
Assistant Vice President, Research and Innovation with the Global MD Program
University of Arizona Health Sciences
<http://painandaddiction.arizona.edu/>

From: Phillips, Brandon - (phillipsb) <phillipsb@arizona.edu>
Sent: Wednesday, December 11, 2024 10:13 AM
To: Vanderah, Todd W - (vanderah) <vanderah@arizona.edu>
Subject: PHCL Courses in MDTD

Hi Todd,

I wanted to reach out to get your approval to use the following PHCL courses in the new proposed MDTD program:

PHCL 386 Intro to Tech Transfer in Medicine – proposed as a core major requirement

PHCL 412 Intro to Pharmacology – emphasis course

PHCL 460 Designing Drugs – emphasis course

PHCL 430 Pain – emphasis course

PHCL 444 Human Neurobiology Basics – emphasis course

Thanks,



Brandon Phillips

Program Coordinator, Senior
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From: Hingle, Melanie D - (hinglem) <hinglem@arizona.edu>

Date: Thursday, December 12, 2024 at 9:27 AM

To: Phillips, Brandon - (phillipsb) <phillipsb@arizona.edu>

Cc: Wilund, Kenneth R - (kwilund) <kwilund@arizona.edu>

Subject: Re: MDTD Emphasis Courses

Hello Brandon

Thanks for your inquiry.

NSC 310 is a popular gen ed course that is offered regularly, although right now, only online.

NSC 275 was part of the Precision Nutrition degree and is not currently being offered. There has been some initial discussion about adding 275 back to the schedule for various reasons, including the fact that it was included as part of the core for the NSW pre-health degree. However, with the ongoing financial issues we are experiencing, it is not a high priority since we are having trouble getting our regular classes covered.



Melanie Hingle, PhD, MPH, RDN

Professor

Associate Director, School of Nutritional Sciences and Wellness

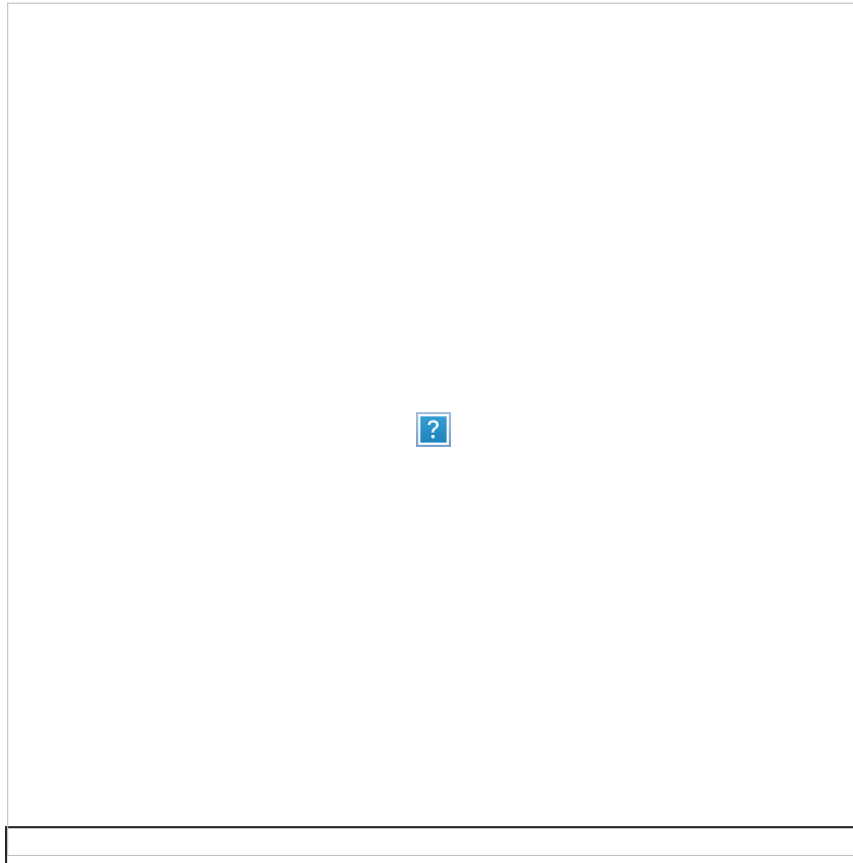
College of Agriculture, Life and Environmental Sciences

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Shantz Bldg, Room 328

Tucson, AZ 85721
Office: 520-621-3087
[Email: hinglem@arizona.edu](mailto:hinglem@arizona.edu)

Co-Editor-in-Chief, [*International Journal of Behavioral Nutrition & Physical Activity*](#)



[Book time to meet with me](#)

From: Phillips, Brandon - (phillipsb) <phillipsb@arizona.edu>
Sent: Monday, December 9, 2024 11:34 AM
To: Hingle, Melanie D - (hinglem) <hinglem@arizona.edu>
Cc: Wilund, Kenneth R - (kwilund) <kwilund@arizona.edu>
Subject: Re: MDTD Emphasis Courses

Hi Melanie and Ken,

I wanted to follow up about the use of these two courses as emphasis electives for the proposed Medical Device Technology Development major:

- NSC 275 Fundamentals of Precision Nutrition and Wellness

- NSC 310 Principles of Human Nutrition in Health and Disease

We are in the process of getting this proposal submitted, and I need a record of support from your department in our use of these courses.

Thank you,



Brandon Phillips

Program Coordinator, Senior
Bachelor of Science in Medicine
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From: Hingle, Melanie D - (hinglem) <hinglem@arizona.edu>

Date: Thursday, October 10, 2024 at 1:32 PM

To: Phillips, Brandon - (phillipsb) <phillipsb@arizona.edu>

Cc: Wilund, Kenneth R - (kwilund) <kwilund@arizona.edu>

Subject: MDTD Emphasis Courses

Hi Brandon

I received this note (below) and I wanted to let you know that Scott Going retired in June 2023, and Ken Wilund, cc'd on this email, is now our School Director. (I think Ken has met your Director). I am coordinating the undergraduate programs in our School, so between Ken and me, we can get your questions answered. Please do reach out with any other questions, and if there is a request for courses to be made available to your students, definitely keep us in the loop so that we can be sure to schedule and staff accordingly.

Thank you!

Melanie

**Melanie
Hingle, PhD,
MPH, RDN**
Professor



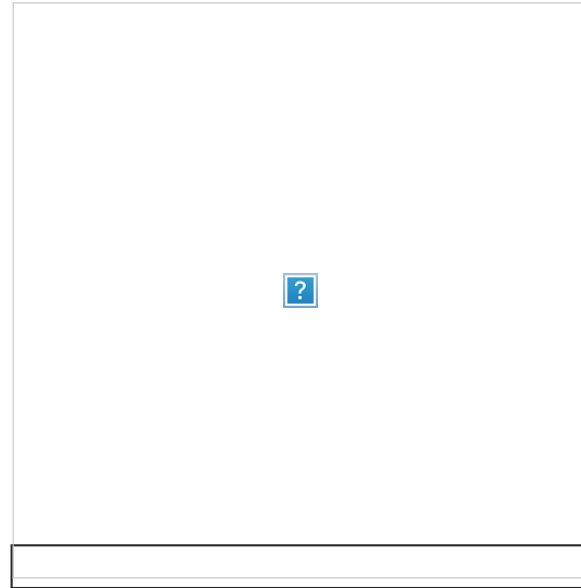
School of Nutritional Sciences & Wellness
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Shantz Building, Room 309
1177 E. 4th Street, Tucson AZ 85721
vamullins@arizona.edu

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From: Phillips, Brandon - (phillipsb) <phillipsb@arizona.edu>

Sent: Wednesday, October 9, 2024 2:39 PM

To: Mendoza, Michelle - (mnmendoz) <mnmendoz@arizona.edu>

Cc: Mullins, Veronica Anne - (vamullins) <vamullins@arizona.edu>; Jackson, Kelly A - (kjackson) <kjackson@arizona.edu>; Going, Scott B - (going) <going@arizona.edu>

Subject: MDTD Emphasis Courses

Hi Michelle,

The last time I reached out to you it was about BS Medicine emphasis courses. Recently, I have been assisting with the proposal for a new undergraduate major in Medical Device Technology Development, and we have selected numerous courses to be included as emphasis electives. Two of these are from NSC. I was hoping you could let me know if the department would approve of their use as emphasis electives in this new MDTD program.

The courses are:

- NSC 275 Fundamentals of Precision Nutrition and Wellness
- NSC 310 Principles of Human Nutrition in Health and Disease

Please let me know if we can use these courses to help build the emphases. Feel free to reach out if you

need more information. We are hoping to get your response by the end of October because this proposal is moving on to next steps very soon.

Thank you,



Brandon Phillips
Program Coordinator, Senior
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From: Mendoza, Michelle - (mnmendoz) <mnmendoz@arizona.edu>

Date: Wednesday, May 31, 2023 at 4:09 PM

To: Phillips, Brandon - (phillipsb) <phillipsb@arizona.edu>

Cc: Mullins, Ronnie Anne - (vamullins) <vamullins@arizona.edu>, Jackson, Kelly A - (kjackson) <kjackson@arizona.edu>, Going, Scott B - (going) <going@arizona.edu>

Subject: RE: BSM Emphasis Courses

Hi Brandon,

Thank you again for your interest in our courses! I appreciate your patience while I consulted with our faculty regarding your requests. We are okay with you listing NSC 101/170C1 and NSC 310 as options for the students. We are also okay offering NSC 315 and NSC 320, but only the online sections due to course capacity.

If you have any additional questions or require any formal agreement, I've included Ronnie Mullins (NHP Program Coordinator), Kelly Jackson (Undergrad Program Director), and Scott Going (School Director) on this thread.

Sincerely,

Michelle Mendoza, MA, [RDN](#)

Director of Student Nutrition Advising Center (SNAC)



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OFFICE OF THE DEAN

February 20, 2024

Marvin Slepian, M.D.
Regents Professor of Medicine – Division of Cardiology
Regents Professor and Associate Department Head – Biomedical Engineering
University of Arizona College of Medicine – Tucson

Dear Marvin:

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

This new Bachelor of Science in Medical Device Technology Development degree will help grow the overall number of students coming to University of Arizona as well as those enrolling on-line. In addition, several Colleges/Departments/Center faculty members are leaders in their fields and are uniquely qualified to contribute to the program. The proposed program emanates from a partnership between the College of Engineering, James E. Rogers College of Law, Eller College of Management, College of Medicine Tucson, University of Arizona Health Sciences and Tech Launch Arizona.

Also, as we launch the Comprehensive Education Core, the BS in Medical Device Technology Development that will utilize the infrastructure to accommodate growth and provide students the support they need to be successful throughout their educational journeys.

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

Sincerely,

Michael M. I. Abecassis, MD, MBA
Iovanna C. Lopez Dean, College of Medicine - Tucson
Professor, Departments of Surgery and Immunobiology

Kevin F. Moynahan, MD, FACP
Vice Dean, Education
Professor, Department of Medicine



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Tel: (520) 626-1197
Fax: (520) 626-1460

February 23, 2024

Marvin Slepian, M.D.

Regents Professor of Medicine – Division of Cardiology

Regents Professor and Associate Department Head – Biomedical Engineering

University of Arizona College of Medicine – Tucson

Dear Marvin:

I am excited to hear about the proposed launch of a new Bachelor of Science in Medical Device Technology Development. The new degree will offer students additional opportunities within the health sciences and meets the needs of a rapidly growing industry. As with any expanding industry, educational pathways that can help students move into the field will be very valuable to employers and sought after by students.

Not only will this degree help grow overall enrollment in a new and dynamic field of study, it also positions graduates to meet the challenges of the future in health care technology. The forward-thinking curriculum will prepare students to enter a fast-changing landscape by providing them with the interprofessional perspective necessary to be successful. This interprofessional partnership between four existing UA colleges, the University of Arizona Health Sciences and Tech Launch Arizona creates a unique opportunity for students by leveraging existing courses and resources.

I strongly support the launch of this program as an addition to the offerings of the College of Medicine – Tucson where it will be well positioned with access to research, clinical and other medical faculty and professionals. The college's history of excellent academic support for students will be key in ensuring their success as this new program ramps up.

Sincerely,

Michael D. Dake, MD

Senior Vice President for Health Sciences

University of Arizona