2017-2018

Program, Policies, and Guidelines

Joint Graduate Program in Biomedical Engineering

University of Texas at San Antonio

University of Texas Health Science Center at San Antonio

Graduate Program for M.S. Degree and Ph.D. Degree

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institutions are expected to continue to develop and expand. The Joint Graduate Program has attracted well-qualified students from not only local institutions (San Antonio and Texas), but also institutions across the United States and internationally. More active recruitment of students continues, and it is expected that the caliber of our matriculating students will increase as a result. Both the students and faculty bring new ideas and additional energy to the developing biomedical industry in San Antonio and South Texas. This Joint Graduate Program has benefited institutions through the production of joint patents, publication ( )10 (pu)10 (pu(p)10 l8 (r)4 (

students the opportunity to be exposed to the many diverse educational and research experiences at both campuses.
Without an initial department to house the Joint Graduate Program and since the UTSA catalog was published before the approval of the program, all BME courses were initially given the Mechanical Engineering (ME) prefix. This ME prefix was later changed to a BME prefix when UTSA established its BME department in early 2006. The current UTSA graduate catalog lists the BME core courses, prescribed electives and free electives. In addition, new BME courses are continuously being added or modified as new faculty members are being added to the Joint Graduate Program and the BME department. As such, changes to courses offered in the BME program will also be reflected every two years when the new catalog is effective. All newly added or modified courses, program policy and information pertaining to student successes will also be continuously updated on the Joint Graduate Program website.

The history of the Master of Science degree in Biomedical Engineering and its relationship to UTSA's strategic plan

Approved in 2003 by the THECB, together with the Joint Ph.D. Program in Biomedical Engineering, the Joint M.S. Program began accepting its first batch of students in fall 2007. Of the eight students accepted, five of them ultimately enrolled for that semester. Like the Joint Ph.D. Program in Biomedical Engineering, students in the Joint M.S. Program are dually-enrolled at UTSA and UT Health San Antonio and thus allowing the students to have similar educational and research opportunities at both institutions.

Reporting/administrative structure

The Deans of the Graduate School and College of Engineering at UTSA and the Dean of the Graduate School of Biomedical Sciences at UT Health San Antonio have overall responsibilities for the Joint Graduate Program in Biomedical Engineering. The graduate faculty of the Biomedical Engineering program, along with the Program Director and Associate Program Director are responsible for curriculum development and ongoing missions of the program.

The Program Director and Associate Program Director advise all graduate students, maintain records, and represent the program. The day-to-day administrative operation of the BME Program is the responsibility of the Program Director, Associate Director, and the Chair of the Committee on Graduate Studies (COGS), a position held by Associate Program Director. The COGS advises and makes recommendations to the Program Director and Associate Director on all educational aspects of the program.

The composition of the COGS for the BME Program consists of the BME program faculty. However, UTSA and UT Health San Antonio should each be represented by at least three members.

The present curriculum requires all PhD students to take 17 semester credit hours of core courses in 1) Responsible Conduct of Patient-Oriented Clinical Research, 2) Experimental Design and Data Analysis, and 3) any four of the following courses: Biomaterials, Experimental Biomechanics, Bioimaging/Physics of Diagnostic Imaging, BME Engineering Analysis, or

member of the UTSA and/or UT Health San Antonio graduate faculty as well as a member of the BME Core faculty. Additional members of the Dissertation Committee are recommended by the supervising professor, in consultation with the student, to the Graduate Program Committee. Upon recommendation of the Graduate Program Committee (COGS), the Graduate School appoints the Dissertation Committee. The committee must consist of at least five members, including the supervising professor, who consults with other members of the committee as work proceeds. The five members must include the supervising professor and two BME program faculty Tc 0.2497e

abstracts and manuscripts, and presentations at national conferences. Language Proficiency: Biomedical Engineering students are required to possess a competent command of English.

• Transfer of Credits: Students in the Joint M.S. Program in BME are expected to complete all coursework at UTSA and/or UT Health San Antonio. Exceptions require approval of the Graduate Program Committee, the Graduate Schools at corresponding

Admission into the Joint Graduate Program is selective with only about 45-50% of the applicants being offered admission. Enrollment has been a subset of those offered admission and has ranged from 40-80%. The average GRE scores of all students matriculating into the Program are Verbal 150 and Quantitative 156.5. The average GPA for the same cohort of students was 3.46 on a 4.0 scale. The racial, ethnic, and gender diversity of the students is also one of the strengths of the Joint Graduate Program and continues the historic role of both UTSA and UT Health San Antonio as minority-serving institutions within the state of Texas.

Recruitment to the Joint Graduate Program comes from the joint BME program website; faculty sponsors local outreach opportunities, national/international conferences, and student organizations. For example, there are student organizations such as the Biomedical Engineering Society which focus their activities at the national conferences, but recently has begun to target high school students and the younger population. Their impact has yet to be determined, but appears promising for future enrollment in the Joint Graduate Program.

Faculty

There are core and associated faculty affiliated with the Joint Graduate Program, with primary appointment either at UTSA and UT Health San Antonio. These faculty members hold academic ranks (Instructor through Professor) at their respective institution. Program faculty at UTSA were drawn from both the College of Engineering (Departments of Biomedical Engineering, Electrical Engineering, and Mechanical Engineering) and the College of Sciences (Departments of Biology, Physics, and Chemistry). Similarly, program faculty at UT Health San Antonio were drawn from the Medical School (Departments of Biochemistry, Molecular Medicine, Physiology, Radiological Sciences, Medicine/Cardiology, Orthopedics, Rehabilitative Medicine and Research Imaging Center) and the Dental School (Departments of Community Dentistry, Periodontics, and Comprehensive Dentistry). In addition, program faculty members are also drawn from local companies and research institutes involved in bioscience research. The Joint Graduate Program has a number of outstanding faculty, several of whom are leaders in their respective fields and internationally recognized. The Joint Program's core faculty is almost equally divided between UTSA and UT Health San Antonio.

Faculty qualifications

The faculty qualifications to be involved with the Joint Graduate Program are:

- A Ph.D., M.D. or an equivalent degree

Faculty will be encouraged to supplement their request with any information they believe is relevant and which supports their application for appointment to the associated faculty.

The COGS is responsible for reviewing each application and then forwarding a recommendation to the Program Director and Graduate Deans at UTSA and UT Health San Antonio for approval. The COGS will review applications two times per year, in June and December. Upon appointment to the program faculty, a separate application for appointment to the Graduate Faculty, if not currently a member, must be submitted to the appropriate Dean's office.

The COGS will also review the performance of existing core and associated faculty every three years based on the criteria above and then recommend appropriate reappointment action.

Resources

Facilities and equipment

The UTSA and the UT Health San Antonio offer many resource facilities with biotechnology equipment and state-of-the art laboratories. The Biotechnology4.1 (a8/MCID 9 (ia)11 (c)44 (c)4 (e)-1 ( )1s1 (l)4

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Major equipment:
11-color LSR-II
13-color FACSAria-IIIu.
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: The Kleberg Advanced Microscopy Laboratory was specially designed to house the JEOL second-generation aberration-corrected electron microscope - one of only two worldwide. With a resolution of 0.8 nm, it is propelling world-class research in nanotechnology, biology, chemistry, geology, engineering, and medicine. UTSA will use the microscope to develop new materials and for many other applications. The microscope will be accessible to researchers worldwide, operating every day around the clock. The laboratory also houses a scanning electron microscope (SEM), a transmission electron microscope (TEM), and two scanning probe microscopy and atomic force microscopy (SPM–AFM) systems.

: Established in 2004, this 5000 sf facility is used to train students for careers in micro and nanotechnology. Areas of research include the utilization of MEMS actuators onphase array antennas, nanotechnology, CMOS-compatible microwave varactors, negative index of refraction materials for imaging and other photonic applications, sensor arrays, micro-

Other Financial Assistance
Teaching and research assistantships may also be available from research mentors. There are also financial aid opportunities such as the Beldon Scholarship, Mcnair & others.

Student Housing
At UTSA students have a choice of on-campus housing options. The newest on-campus residences are Laurel Village and Chaparral Village. These two complexes offer apartment-style living with a choice of either two or four private bedrooms in an apartment with a living room and a kitchenette with a microwave, sink and full-size refrigerator (no stove/oven). These complexes are owned and managed by UTSA and residents are required to purchase meal plans.

BME Graduate Program: Admissions

1. Application Method

a. The Biomedical Engineering (BME) MS/PhD program is for students with a bachelor's or advanced degree (MS, PhD, MD, or DDS) who want to obtain a MS/PhD degree in Biomedical Engineering.

b. Students will apply to the BME MS/PhD program through a central application process through UTSA. All applications and associated data are forwarded and entered into PeopleSoft and/or IMPACT database(s) at UT Health San Antonio. All applications must be reviewed by the Admissions Committee, which makes recommendations to the Program Director and Associate Program Director. All admissions (MS/PhD programs) must be approved by the Program Director, Associate Program Director, Dean of the Graduate School at UT Health San Antonio, and the Dean of the College of Engineering at UTSA for MS students or the Dean of the Graduate School at UTSA for PhD students, respectively. UTSA will share all accepted applications with

IMPORTANT NOTE: All students who are currently here on a non-immigrant visa must consult both the Office of International Services at UT Health San Antonio and/or the Office of International Programs at UTSA before program content and industry knowledge, and 2) that the learning outcomes achieved prior are reflective of those in place at the time of program completion. In scenarios where the mentor and/or program and school administrators determine that program content, industry knowledge or learning outcomes have evolved, those individuals will collaborate on a plan for repetition of course work and/or examinations. Said plan must

2. Admitted students must register for BME MS/PhD program classes by the deadline(s) of each Institution, or prior to the beginning of the first day of classes for the term, at the discretion of the Institution.
3. A student is eligible to register if he/she is in good standing in both institutions. Good standing will be defined by the published and/or practice of the Partner Institution in which the student is enrolled and can include the following: GPA of 3.0 or better, having no unpaid institution debts, and/or having no institution holds or any other restrictions that would not allow registration. If such definition is not as stringent as that of the Home Institution, the definition of the Home Institution will apply.
4. A student must remain active at his/her Home Institution if he/she is also seeking registration at the Partner Institution. For any semester where the student is not taking at least one semester credit hour at UTSA, the student will still be considered "active" and must be enrolled via a zero credit hour "placeholder" course. UT Health San Antonio will not require placeholders and will simply keep the students active in a term without enrollment. In each semester, the student's Home Institution should maintain a record of the total semester credit hours being taken for that term regardless of class location, as a method of enrollment tracking, especially for those students who must maintain full time status. For tracking purposes, "placeholder" registration, or whatever procedure is used, should not activate any coursework-specific tuition/fees. However, the Partner Institution may, based on respective policies, have the option to assess certain extraneous fees (parking, ID badge, recreation, etc.) attributable to that institution's management or maintenance of certain services provided for all enrolled students. In addition, a student must also be registered at a specific Partner Institution if that student is using that Partner Institution's resources of any kind such as attending classes, taking examinations, conducting dissertation or thesis research, defending a doctoral dissertation or M.S. thesis, graduating, etc. Students enrolled in research courses must at least be registered at their Home Institution in all semesters during the research process.
   a. Master's with thesis: Any master's student conducting research with a supervising professor at UT Health San Antonio must enroll for a minimum 6 SCH total, and at least 1 SCH per semester, of BIME 6097 Research. Students must also enroll for one semester of BIME 6098 Thesis (See UT Health San Antonio Catalog for details on specific requirements on enrollment criteria). Students conducting research with a supervising professor at UTSA must be enrolled in a minimum of 6 SCH total of BME 6981, 2, 3, or 6. met bnr( )9. (o)-2 (lle)-(l)10 4 (o)-2 (r a m(at)-3)-4(n)-4 (a mi4 (s)2 1)ufe SCH toor a (

BME Graduate Program: Financial Aid and Veteran Benefits Procedure

1. As indicated in the Admission Policy, all admitted students must have a derived Home Institution, including without limitation any student receiving financial aid through the US Department of Education, the Department of Defense and/or any other government entity or private resource as may be identified by any Partner Institution. In addition, it is strongly recommended that any such student not change their Home Institution designation over the course of their academic career unless the student changes mentors or the students mentor changes his/her primary appointment, and the change is supported by the BME COGS.
2. Each student will have an academic curriculum (Plan of Study) established in consultation with faculty advisors and shared with the Partner Institution by the Home Institution before matriculation begins.
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2. **Residency:** Tuition and fees will be based on the student's domicile residency status for the purpose of assessing tuition and fees. This status will be determined by UTSA as all students will first apply to UTSA. This residency is to be distinguished from the residency determination involving non-immigrant visa status. Initial charges for tuition and fees will be calculated by the student's Home Institution using the applicable Texas Education Code, the THECB rules, UTS regulations, and applicable HOP procedures for that Home Institution. As a general rule, assessments will be calculated by the Partner Institution. Once residency is correctly established, the residency designation will be the same for the student's enrollment at the other Partner Institution. Students who do not qualify for in-state tuition, may seek tuition waivers. Institutional requirements must be met for waivers.

3. **Tuition:** Students will be billed and by the Home and Partner institution in which they are enrolled in accordance with the Partner Institution's published tuition and fee schedule. Each student will be responsible for **payment of tuition and fees** to each Partner Institution in which the student is enrolled. Tuition will be based on semester credit hours of enrollment at the respective Partner Institution. Students who receive financial aid, veteran benefits, or other supportive funding through their Home In(r)4 (I)7 (aH0t19 Tw TTc 0 Tw3 (mt (m)4 (e)3 (0 (ig Tc 0.0297 (y)7 (

1. **Definition of International Student and Visa Sponsorship.** International students shall be defined as applicants for the program who are non-U.S. citizens or permanent residents and require sponsorship for an F-1 (or J-1 in limited circumstances) student non-immigrant visa to legally enter or remain in the United States. Such students shall be eligible for admission to the BME program subject to the same admission and registration criteria applied to domestic students. Any international student accepted into the BME program will generally be required to have an F-1 student visa, which mandates full-time enrollment for all academic terms required by the program for each year. Some applicants may be eligible for initial or continued sponsorship for a J-1 visa under the specific eligibility requirements set out by federal regulations.

2. **Eligibility for and Maintenance of F-1 Nonimmigrant Status.** To be eligible for an F-1 visa, an international student must have and must maintain a home institution affiliation for the entire duration of his/her time in the BME program. Since all applications will initially be processed by UTSA, UTSA will be the Home Institution for all new incoming international students except for those who have supervising professors at UT Health San Antonio. The Home Institution will issue a

prior to or at the beginning of a new term with the approval of both DSO's at the Partner institutions. For the transfer to be completed, the following must occur prior to

1. One of the goals of the BME program is to promote collaboration among faculty, students, and staff which will generate new intellectual property to help mankind. The collaborations are multi-disciplinary and multi-institutional.
2. UTSA policies for IP and revenue sharing shall apply to BME program graduate students (“Bgram g

2. Student Security and Identification

Each Partner Institution establishes and maintains its own protocol, system, and procedure for protecting and identifying official matriculated students. Such identification is normally provided in the form of a numbered picture identification card/badge that must be carried by all registered students and presented to campus police upon request. This card/badge also allows access to certain campus facilities. Authority to issue such identification by campus police is generally part of the enrollment process of each Partner institution. A small fee is normally assessed for the processing and creation of the card/badge. Due to the importance of this card/badge and the fact that students in the BME Program may have to carry several cards/badges, all students should be encouraged to personally check the authenticity of all cards/badges with the appropriate institution authority on a regular basis (i.e.: at least annually).

3. Technology, Technology Support

a. Technology is heavily used by students and faculty whether classes are on site or online. It becomes even more crucial for students and faculty who are involved in concurrent enrollment or a combination of onsite and online or distance classes. Such technology requires ready and speedy access to technical support for the faculty and students. All Partner institutions have technical

Students receive a Microsoft LiveMail account, access to the wireless internet, and health services, it is recommended that students use their Home Institution health services unless there is an immediate concern while attending a Partner Institution.

c. **Immunization. All incoming students** admitted into the BME joint program must adhere to the UTSA and UT Health San Antonio immunization requirements and have their immunizations **completed prior to registration** at UT Health San Antonio and UTSA. Required routine immunizations must be completed **prior to registration** to protect your health and minimize any adverse reactions during the early part of your education. UT Health San Antonio immunization requirements can be found at the Student Health Center's website at http://shc.uthscsa.edu/ with specific requirements and form at http://shc.uthscsa.edu/pdf/immunizationrecord.pdf. Return the above Immunization Record to the Student Health Center at least 30 days prior to registration.

d. Consistent with the above resulting "regional policy" determination by the same UT System carrier, all Partner Institutions will provide health services to any student in the BME program under the same guidelines and protocol, including fees if applicable and
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2017-2019 Program of Study for the Doctoral Degree

[redacted]

in Biomedical Engineering

UTSA UTHSCSA Joint Graduate Program

BANNER ID:	
PROGRAM	Biomedical Engineering

NAME:	
CATALOG: (year admitted)	
CONCENTRATION	

The following courses are required for the degree indicated below*:

Course No.	Course Title	Credit Hours	Grade	Semester Taken	When & Where completed if not at UTSA or UTHSCSA
UTSA REQUIRED CORE COURSES (Total of 12 semester credit hrs)					
	Experimental Biomechanics (spring)	3			
UTHSCSA REQUIRED CORE COURSES (Total of 2 semester credit hrs)					
TSCI 5070	Responsible Conduct of Patient-Oriented Clinical Research (fall)	2			
REQUIRED CORE COURSES OFFERED AT UTHSCSA (Total of 3 semester credit hrs)					

[redacted]

BANNER ID:	
PROGRAM	Biomedical Engineering

NAME:	
CATALOG: (year admitted)	
CONCENTRATION	

Course Catalog

The Department of Biomedical Engineering offers the Master of Science degree in Biomedical Engineering and the Doctor of Philosophy degree in Biomedical Engineering. Please use the following link to view the 2015-2017 catalog for the Department of Biomedical Engineering. http://catalog.utsa.edu/graduate/engineering/biomedicalengineering/#text

Course descriptions for the Department of Biomedical Engineering can be viewed at: http://catalog.utsa.edu/graduate/engineering/biomedicalengineering/#courseinventory

Master of Science Degree in Biomedical Engineering

A Master of Science (M.S.) degree in Biomedical Engineering (BME) at The University of Texas at San Antonio (UTSA) is offered through a joint graduate program with The University of Texas Health Science Center at San Antonio (UT Health San Antonio). A matrix of academic tracks is offered based on segments of biomedical engineering and/or areas of clinical emphasis. Specifically, the program has emphases in the following areas: biomaterials, biomechanics, and bioimaging. The biological areas covered are orthopedics/dental tissues, cardiovascular systems, and neural systems. The M.S. degree in Biomedical Engineering (Thesis Option or Non-thesis Option) will be awarded to candidates who have displayed an in-depth understanding of the concepts that are necessary for critically judging the scientific literature, for formulating novel hypotheses, designing experimental protocols to test the hypotheses, interpreting their results and demonstrating their ability to make an original contribution to knowledge in the biomedical field.

The regulations for this degree comply with the general University regulations (refer to Chapter 2, General Academic Regulations, and Chapter 4, Master's Degree Regulations).

Admission Requirements

Students who hold an undergraduate degree may apply to the program. The minimum requirements for admission to the Master of Science degree in Biomedical Engineering program are described below. Note that admission is competitive and satisfying these requirements does not guarantee admission.

- Applicants must have a grade point average of 3.0 or better in the last 60 semester credit hours of coursework with a major in a recognized science or engineering discipline. All students should have had sufficient background in engineering, chemistry, biology, and physics prior to being admitted to the program. It is expected that these students will have B.S. degrees with an emphasis in either engineering, physical science, or biological science disciplines. All students are required to have completed at least one year of engineering physics, chemistry, biology, and mathematics (up to Differential Equations I or Applied Engineering Analysis I). Students with deficiencies in the above courses will be required to satisfactorily complete selected courses as a condition of acceptance.
- A satisfactory score, as evaluated by the Admissions Committee for Biomedical Engineering, is required on the Graduate Record Examination (GRE). Students whose native language is not English must achieve a minimum score of 550 on the Test of English as a Foreign Language (TOEFL) paper version or 79 on the Internet version. The applicant's performance on a standardized test will be considered in addition to other

criteria for admission or competitive scholarship awards and will not be used as the sole

BIO 5433	Neurophysiology
BIO 5483	Computational Neuroscience
BIO 5503	Sensory Physiology
BME 6093	Topics in Biomedical Engineering
BME 6111	Introduction to Clinical Practices
BME 6123	Medical Device Design
BME 6143	Biomedical Device Development
BME 6203	Physiology for Engineers
BME 6213	Cellular Engineering
BME 6223	Transport Processes in Biological Systems
BME 6233	Cardiovascular Bioengineering
BME 6243	Mechanobiology
BME 6253	Bioheat Transfer
BME 6303	Computational Oncology and Cancer Treatment Simulations
BME 6313	Computational Bioengineering and Biomedicine
BME 6323	Bioinformatics
BME 6333	Stochastic Modeling in Bioengineering
BME 6343	Statistical Pattern Recognition and Data Mining in Biomedical Engineering
BME 6353	Computational Methods in Mass Spectrometry
BME 6363	Multiscale Computational Modeling of Biomedical Systems
BME 6523	Biological Laboratory Techniques in Biomedical Engineering
BME 6723	Bioinstrumentations
BME 6733	Microfabrication and Application
BME 6743	Biophotonics
BME 6753	Biosensors: Fundamentals and Applications
BME 6793	Topics in Image and Signal Processing
BME 6823	Advanced Biomechanics
BME 6843	Tissue Mechanics
BME 6863	Mechanical Behavior of Living Tissues
BME 6873	Biofluid Mechanics
BME 6893	Topics in Biomechanics
BME 6913	Biomaterials II
BME 6923	Tissue Engineering
BME 6933	Tissue-Biomaterials Interactions
BME 6943	Biomaterials and Cell Signaling
BME 6953	Biomaterials for Drug-Delivery/Pharmacology

BME 6963	Fundamentals to Polymer Science with Select Biomedical Applications
BME 6973	Current Analytical Tools for Biomaterials Characterizations
BME 6993	Topics in Biomaterials
CHE 5263	Advanced Analytical Chemistry
EE 5243	Topics in Systems and Control
EE	

Composition of the Master's Thesis Committee

The Master's Thesis Committee is made up of at least four members. The committee should consist of the Supervising Professor, one BME program faculty member from UTSA, one BME program faculty member from UT Health San Antonio, and one external member who is not a BME program faculty. For students whose supervising professor is at UTSA, dissertation committee has to be made up of at least 50% membership from UTSA. The student's thesis proposal and the proposed composition of the Master's Thesis Committee will be evaluated and approved by the COGS.

Final Oral Examination (Defense of Thesis)

A satisfactory final oral examination is required for the approval of a thesis. Acceptance of the thesis will be contingent upon approval of the respective Master's Thesis Committee. The thesis defense consists of a seminar presentation by the candidate to the general public. A closed door examination by the Master's Thesis Committee follows and covers the general field of the thesis, and other parts of the student's program as determined by the respective committee. Members of the Master's Thesis Committee must be satisfied that the student has:

1. Completed the research approved by the Master's Thesis Committee.
2. Passed all examinations required by the COGS, including the successful defense of the thesis.
3. Completed the required coursework.
4. Completed a thesis that is an independent investigation in the biomedical engineering field and constitutes a contribution to the respective discipline.

Upon successful completion of the aforementioned requirements, the Master's Thesis Committee members will sign the approval forms for the Master's Thesis and make an official recommendation to the Graduate School of Biomedical Sciences at the UT Health San Antonio or to the Graduate School at UTSA that the Master's degree be awarded.

Degree Requirements and Program of Study – e2Tdct(a6)T76.1

Required Core Courses offered at UTSA:
BME

registration at UT Health San Antonio should be directed to the BME Program Office at UT Health San Antonio. The minimum required curriculum for all students is as follows:

A. Core Courses: 16

Required Core Courses offered at UTSA:

BME 6033 BME Engineering Analysis [1]

Upon approval of the Supervising Professor and the Program Director, students may substitute EGR 5093 (Special Topics in Engineering Analysis) for BME 6033 (BME Engineering Analysis).

BME 6203 Physiology for Engineers

EE 6363	Advanced Topics in Signal Processing
ME 5013	Topics in Mechanical Engineering
ME 5243	Advanced Thermodynamics
ME 5413	Elasticity
ME 5463	Fracture Mechanics
ME 5473	Viscoelasticity
ME 5483	Finite Element Methods
ME 5613	Advanced Fluid Mechanics
ME 5653	Computational Fluid Dynamics
ME 5713	Mechanical Behavior of Materials
ME 5743	Composite Materials
STA 5103	

at least 50% membership from UTSA.

Graduate training entails both formal education in advanced scientific knowledge and theory as well as research training under the supervision of one or more investigators who are qualified to fulfill the responsibilities of a mentor. A positive mentoring relationship between the graduate student and the responsibil610 supervising professor is a vital component of the student's preparation for a successful biomedical career.

[illegible]

[illegible] (How often will student and mentor meet? How should updates or changes in expectations and issues be communicated?)

[illegible] (What is the student's project? Is there a specific person that will oversee training other than the PI and to what degree will the student assist with other projects in the lab? What constitutes professional development?)

[illegible] (Which tasks and duties are shared among all lab members, including the student?)

[illegible] **[illegible]** (What is the policy of the laboratory related to the storage of data and laboratory notebooks?)

[illegible] (How many hours per week is the student expected to work in the laboratory?)

[illegible] (What is the policy that constitutes authorship in the lab? How is the order of authors determined in a manuscript or abstract?)

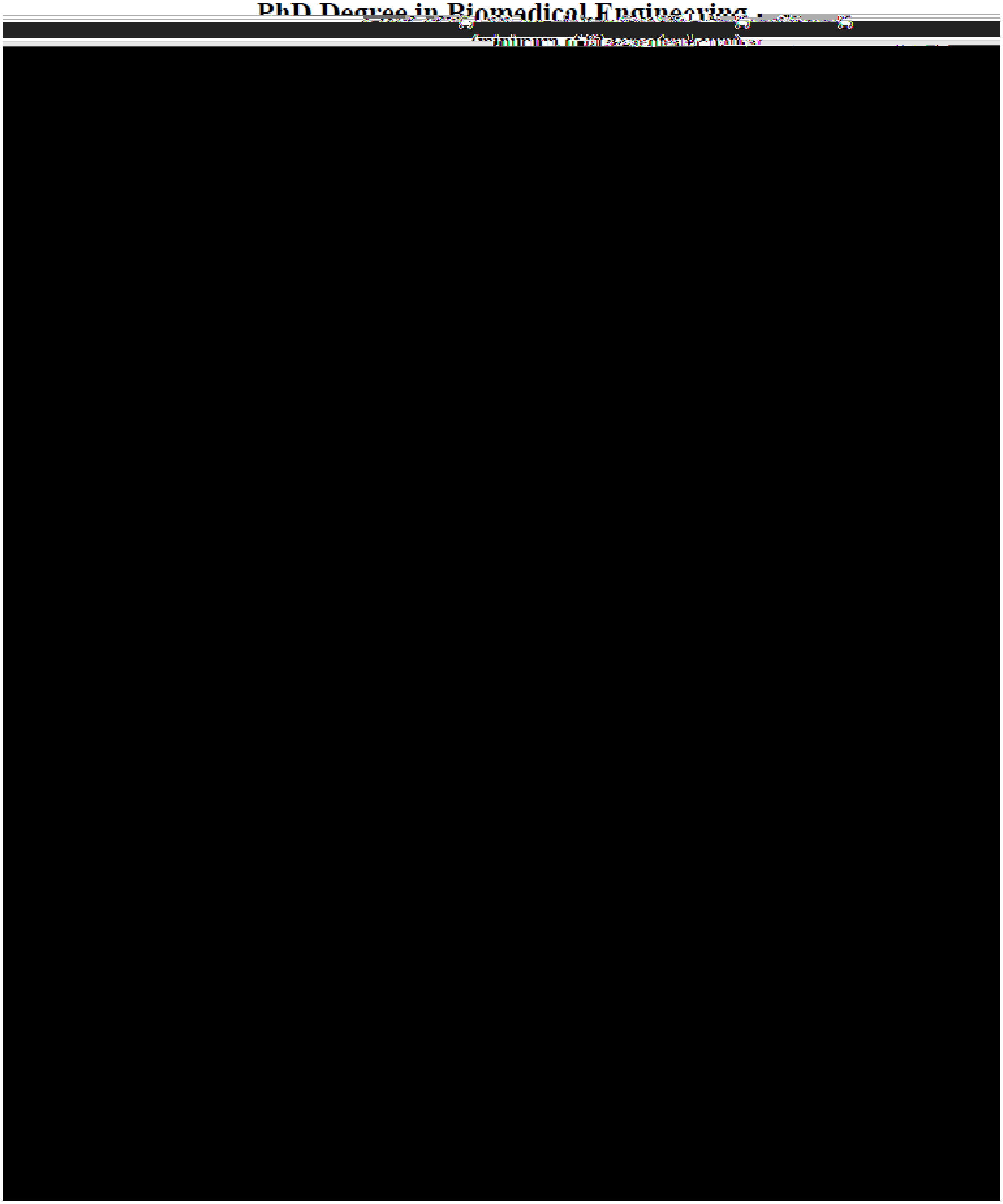
[illegible] (Are there specific expectations for the number of manuscripts (published, submitted and/or in preparation), and the student's authorship position (e.g. first) on these manuscripts, required for the student to graduate?)

[illegible]
(What is the policy for patents that come out of the studenn81udent(t)-6.6 (i)w[(f)-17.5 (/)-6k8 (2n

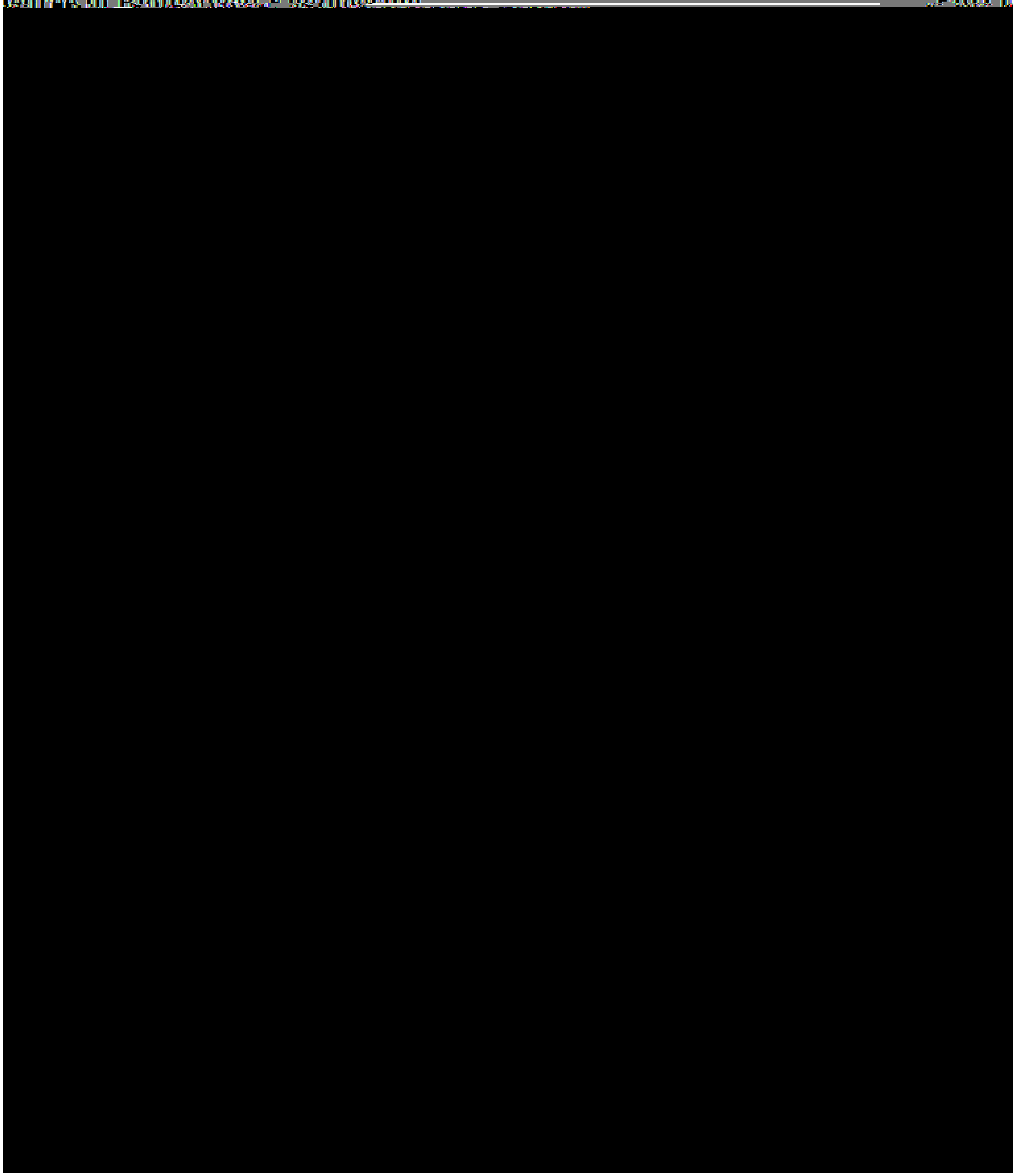
[illegible]

(insert the approved Milestone Agreement for the student’s program)

Key Milestones For Obtaining A PhD Degree in Biomedical Engineering



Key Milestones For Obtaining A PhD Degree in Biomedical Engineering



es For Obtaining A	Key Mileston

Key Milestones for ...

(minimum of 36 semester hou...

1st Semester

1. Register for courses (core and elective) courses*

2nd Semester

3rd Semester

1. Register for courses (core and elective) courses

... program ... for approval.

4th Semester

1. Register for courses (core and elective) courses

2. Register for Comprehensive Exam

3. Apply for Graduation@

*Check with ... for required core and elective courses

@Check with Graduate School (website) for deadlines