

# MASTER OF DEAF EDUCATION AND HEARING SCIENCE

The Master of Deaf Education and Hearing Science (MDHES) Program, nationally certified by the Council on Education of the Deaf, was created in 2002 in order to provide graduate students in deaf education the opportunity to build the relationships needed to provide quality services to children who are deaf or hard of hearing. This program is one of only a handful in the country that provides intensive training in how to help deaf or hard of hearing children develop spoken language through the use of residual hearing, high-powered hearing aids and modern surgical procedures such as cochlear implants. The San Antonio-based program holds courses at an approved off campus location, Sunshine Cottage School for Deaf Children, located at 603 E Hildebrand Ave, San Antonio, Texas 78212. A Houston-based cohort is accepted biannually with synchronous courses held via teleconference at Texas Hearing Institute, located at 3100 Shenandoah St, Houston, Texas 77021.

Certified teachers for children with hearing loss are in high demand. Every year positions across the nation go unfilled because of the lack of qualified professionals. In Texas alone, 20-30 teacher vacancies go unfilled annually. If you have an interest in children, language and communication, and a bachelor's degree already, the MDEHS could be the next step in your career. There are generous tuition scholarships available.

## Admissions Requirements

Application for admission to the Master of Deaf Education and Hearing Science (<https://lsom.uthscsa.edu/otolaryngology/academics/deaf-education/>) (MDEHS) Program may be completed online at <https://www.goapplytexas.org>. Admission information can be found on the program's website (<https://lsom.uthscsa.edu/otolaryngology/academics/deaf-education/>).

All required admissions information and documents must be submitted to the department before an applicant is considered for admission. Because applications and documents are reviewed as they are received, applicants are encouraged to apply early in the application period. Classes begin in the summer semester each year.

## Admission Requirements

To be admitted to the MDEHS (<https://lsom.uthscsa.edu/otolaryngology/academics/deaf-education/>) Program, applicants must have earned a baccalaureate degree from an accredited college or university, with an overall grade point average of 3.0. Incoming students must have completed a baccalaureate degree in education or a related field (e.g., communication science disorders). Depending on the applicant's background, pre-requisite coursework in curriculum and instruction from another college or university may be required. In addition, 50 hours of classroom observation and 25 hours of field experience may be required for non-education majors. Observation and field experience hours may be waived based upon review of undergraduate transcripts and experience.

## Degree Requirements

### State Certification

Deaf Education and Hearing Science is a profession requiring certification in teaching children with hearing loss. State of Texas Certification examinations are administered through the State Board of Educator Certification (SBEC) (<http://www.tea.state.tx.us/index4.aspx?id=3461>).

All students who enter the program already holding teacher certification must pass the Texas Examinations of Educator Standards (TExES) Deaf and Hard of Hearing (#181). Students who enter the program as non-teachers must also become certified as teachers in Texas and must pass the Pedagogy and Professional Responsibilities Exam, EC-12 (TExES). The MDEHS Program is nationally accredited through the Council on Education of the Deaf (CED) (<http://www.deafed.net/PageText.asp?hdnPageId=58>). It is highly recommended that students apply for certification through CED as well.

## Co-Requisites

Two sign language classes from an accredited college or university must be completed during coursework.

Sample Plan of Study

## Co/Pre-Requisites

- ASL I
- ASL II

### First Year

Summer		Credit Hours
DEHS 5007	Introduction to Audiology	3
DEHS 5005	Factors In Child Language Acquisition	2.5

### Fall

DEHS 5003	Speech Mech-Anatomy/Physiology/Acoustics	2.5
DEHS 5011	Language Development	3

EDP 5303  
Educational  
Measurement  
and  
Assessment <sup>1</sup>

### Spring

DEHS 6009	Aural (Re) Habilitation	2.5
DEHS 6008	Speech for Hearing Impaired Student	2.5
EDP 6243		3

Cognitive  
Assessment  
and  
Intervention <sup>1</sup>

### Second Year

#### Summer

INTD 5064	Applied Statistics for Health Care Practitioners	3
DEHS 6004	Curriculum Mod-Child W/Hear Loss	2.5
EDP 5033		3

Human  
Development  
Across the  
Lifespan <sup>1</sup>

#### Fall

DEHS 6006	Best Practices in Early Intervention	2.5
DEHS 5021	Teaching/Management Apprenticeship 1	4
DEHS 6002	Counseling Families of Children with Hearing Loss	1.5

#### Spring

DEHS 6022	Teaching/Management Apprenticeship 2	4
DEHS 5001	Foundations of Ed for the Deaf	2.5

DEHS 6099	Comprehensive Examination	0
<b>Total Credit Hours:</b>		<b>45.0</b>

<sup>1</sup> These are educational psychology courses that will be taken at UTSA.

## Objectives/Program Outcomes

The MDEHS (<https://lsom.uthscsa.edu/otolaryngology/academics/deaf-education/>) Program is based on, and committed to, teaching future teachers of the deaf the listening & spoken language method of intervention/education for children who are deaf or hard of hearing, as stated in the Auditory-Verbal Position Statement published by the Board of Directors of Auditory-Verbal International.

In addition, the program's philosophy encompasses the following educational assumptions:

- Many profoundly deaf children can obtain an excellent education in an auditory-oral or listening & spoken language environment;
- At some time during the educational years, it is desirable that a child who is deaf or hard of hearing attend school with her/his hearing peers;
- Applicants with a baccalaureate degree in education or related fields can become effective teachers of the deaf and hard of hearing through application of previously gained knowledge and skills plus the acquisition of procedures, techniques, and information unique to the deaf or hard of hearing child. The MDEHS curriculum addresses topics and skills required for Texas teacher certification and national certification.

Each deaf or hard of hearing child is a unique combination of learning styles, degrees of and adjustment to a hearing loss, motivation toward learning, home and community experiences, intellectual abilities, and personal responses to the environment. A dually prepared teacher is in an enviable position of being able to identify these factors and create a learning setting that would permit maximum attainment not only by the child who is deaf or hard of hearing, but also the typically developing children.

## Deaf Education Program Grading System Grades

The standing of students in their work is expressed by the following grades:

A = Excellent

B = Above Average

C = Average

D = Below Average

F = Failure

Grades for courses in which performance is graded an **S** (Satisfactory) or **U** (Unsatisfactory) are not used in computing the grade point average. The symbol **I** (incomplete) may be recorded for a student who has not completed course assignments at the conclusion of the course.

In some programs, students have the option of seeking exemption from certain courses in the curriculum if they have successfully completed an equivalent course in the curriculum at another college or university

or content in an examination. The symbol **CR** (Credit) is recorded for a course(s) for which the student has been exempted.

## Grades in Clinical Rotations, Practicums, and Fieldwork Courses

Clinical rotation, practicums, and fieldwork courses may be graded **S** (Satisfactory) or **U** (Unsatisfactory), or may be assigned a letter grade, depending on the departmental policy.

A grade of **S** or **other designation of an acceptable grade** is assigned if the student successfully satisfies the criteria for clinical courses. Failure to successfully satisfy the course criteria may result in an **I** (Incomplete) or a **U** (Unsatisfactory) or a letter grade considered unsatisfactory based on departmental policy.

Criteria and time frame for removal of an **I** or **U** or **other unsatisfactory grade** in clinical courses are determined based on clinical documentation and consultation with the clinical supervisor/clinical instructor, not to exceed one full calendar year. An **I** or **U** or **other unsatisfactory grade** may require that the student complete an additional clinical affiliation or other remediation that could extend the professional curriculum beyond the expected graduation date. More than one **unsatisfactory** grade is not allowed within the total clinical course sequence.

## Courses

### DEHS 5001. Foundations of Ed for the Deaf. 2.5 Credit Hours.

History of the education of the hearing impaired including Deaf Culture and American Sign Language (ASL). Impact of hearing loss on academic access, vocational choice, and personal development. Current trends in academic programming, parent-infant through college, and provisions for multicultural populations.

### DEHS 5003. Speech Mech-Anatomy/Physiology/Acoustics. 2.5 Credit Hours.

This course is a study of the component parts of the speech mechanisms and their coordination to permit functional speech, physiology and acoustics of speech, impact of hearing loss on development and maintenance of functional speech skills, and individual assessment procedures. Practicum included.

### DEHS 5005. Factors In Child Language Acquisition. 2.5 Credit Hours.

Course content includes the normal progression of language, cognition and social development, and how hearing loss impacts on development; an overview of acquisition of language by children who may have more than one handicapping condition; the nature of bilingual and ESL language learning in relation to hearing loss, including the impact of visual language learning through speech reading and signing systems; and the nature of language development as related to learning theories, communicative functions, and culture. Practicum included.

### DEHS 5007. Introduction to Audiology. 3 Credit Hours.

Nature of sound, anatomy, and physiology of hearing; types of testing for hearing loss; analysis of audiograms; fitting of ear molds; operation and design of hearing aids; use and maintenance of FM units; and Cochlear implants and assistive technology. Practicum included.

### DEHS 5011. Language Development. 3 Credit Hours.

Course content includes the assessment of present language and listening levels in hearing impaired children and methods of aural habilitation and language instruction/therapy. Practicum included.

**DEHS 5021. Teaching/Management Apprenticeship 1. 4 Credit Hours.**

Students spend time in the education and management/coordination of services for the hearing impaired. Students spend time teaching both hearing and hearing-impaired students and in managing and coordinating social, education, and health services for the hearing impaired. Course fees: Practicum \$10.

**DEHS 5090. Independent Study. 0.5-4 Credit Hours.**

This course will be arranged through DEHS faculty. Topic and mode of study are agreed upon by student and instructor. Semester hours are variable and credit hours will be determined per topic. The course is offered any term. The course may be repeated for credit when topics vary.

**DEHS 6002. Counseling Families of Children with Hearing Loss. 1.5 Credit Hour.**

The impact of a hearing loss upon the child, the family, and the community; reactions and adjustments identified and evaluated; delivery of services from birth through adulthood; and newborn screening are included. Crisis periods are identified and coping mechanisms evaluated. Also included are the role of classroom teacher and health professional in providing support to the family, and a multi-professional team approach to long-term management for the hearing impaired.

**DEHS 6004. Curriculum Mod-Child W/Hear Loss. 2.5 Credit Hours.**

Course content includes the development and adaptation of curricular materials and instructional procedures for the child with hearing impairment; selection and writing of objectives for speech, language, and listening within the content of early childhood education best practices; impact of current research in the effective teaching of reading and the language arts for children with hearing loss, including the identification of techniques and materials useful in meeting the individual needs of each student. Students will have the opportunity to learn adaptive strategies to address the needs of students with multiple handicaps. Practicum included.

**DEHS 6006. Best Practices in Early Intervention. 2.5 Credit Hours.**

Provision of services to infants, toddlers and preschoolers and their families through public and private agencies. Use of the Auditory-Verbal Therapy approach emphasizing the development of optimum listening skills in children with hearing impairment and the recognition of caregivers as the primary models of spoken language. Includes parent guidance, counseling, education and support. Practicum is included.

**DEHS 6008. Speech for Hearing Impaired Student. 2.5 Credit Hours.**

This course addresses: specific development and remedial techniques for articulation therapy; assessment of phonetic and phonologic level skills; strategies for elicitation, development; transfer and maintenance of all English phonemes and suprasegmentals; and choosing techniques appropriate to auditory/visual/tactile modalities available to the child with hearing loss. Practicum included.

**DEHS 6009. Aural (Re) Habilitation. 2.5 Credit Hours.**

This course is designed to study methods of pediatrics aural rehabilitation available for children with hearing loss and the impact of new technologies on therapy and teaching.

**DEHS 6022. Teaching/Management Apprenticeship 2. 4 Credit Hours.**

Continuation of Teaching/Management Apprenticeship I. Students will be required to develop a comprehensive portfolio of their experiences and abilities. Outcomes of their knowledge and skills gained in the program are emphasized. Course fees: Practicum \$10.

**DEHS 6099. Comprehensive Examination. 0 Credit Hours.**

The comprehensive examination is required prior to graduation. The examination, which incorporates all critical elements of the curriculum, tests for mastery of knowledge as well as professional skills.

**Courses****INTD 1091. Independent Study. 4 Credit Hours.**

Students will work directly with a faculty advisor or assistant dean to develop an independent plan of study.

**INTD 3001. International Elective. 0 Credit Hours.**

Students will work with the course director and Assistant Director of Global Health to identify an appropriate international elective site, using established sites/programs or one that the student discovers on their own. All rotations must be vetted and approved by the course director and will adhere to a community service-learning model that is a structured educational experience combining community service with preparation and reflection. Students are expected to help shape the learning experience around community-identified needs and advance insight related to the context in which service is provided, the connection between service and academic coursework, and students' roles as citizens and professionals. Students will spend 4 weeks living and working at an international service site. Sites may allow for a range of experiences, such as participating in patient care, conducting clinical or public health research, and/or participating in a language immersion program. There may also be opportunities for patient education and emphasis on efforts of local empowerment, aiming to build up the communities in a sustainable way. Regardless of the focus, all sites must be supervised by qualified health care providers. Students are encouraged to integrate themselves into the health care delivery system, to explore community needs that they could address, and when possible, to strive to make an impact through community education, home visits, and research. Reflection essays serve as a way to process experiences, including clinical cases, new perspectives gained, and analysis of health care disparities, and strategies for the overcoming poverty-related health problems. Students are encouraged to share their experiences upon return through a formal presentation.

**INTD 3002. School of Medicine Research Elective. 0 Credit Hours.**

Students will participate in basic or clinical research projects under the supervision of university faculty. The goal of this elective is to immerse students in a rich research environment and provide an opportunity to work with research mentors to fully engage in the research process from writing the proposal to collecting the data to disseminating research results. This elective is open to students who already have an established working relationship with a faculty member and who wish time to continue their work, students who wish to establish a new project, and for students who are in the MD-MPH degree program and MD with Distinction in Research Program. Interested students must contact the course director prior to the enrollment date to express interest in the elective and receive further instructions on the application process for the research and identification/ confirmation of the faculty mentor.

**INTD 3030. Clinical Foundations. 3 Credit Hours.**

The purposes of this completely online course are to: 1. Prepare early clinical students to increase knowledge in clinical settings including: a. Exposure to healthcare team members, b. Exposure to roles on clerkship (H&Ps, orders, SOAP notes, prescriptions, etc.), c. Interpretation of EKGs and radiographs, d. Interpretation of normal/abnormal lab values, e. Recognition of fatigue/strategies to combat fatigue in clinical settings, f. Basic understanding of ventilator management/ICU care, g. Patient insurance issues/patient health care financial resources, h. Avoidance of medical legal problems, i. Better success on exams, j. Performance of evidence-based searches in medical literature, k. Understanding fundamentals of translational research; 2. Assist students in developing new skills expected of early clinical students including: a. Intravenous catheter placement, nasogastric catheter placement, urinary catheter placement, and O2 management, b. Sterile gloving and sterile technique, c. Basic suturing/staple placement and removal; and 3. Prepare early clinical students for their roles in clinical settings including: a. Patient care under supervision, b. Patient privacy-HIPAA, c. Professionalism and responsibility to team and patients, d. Patient safety, e. Proper use of social media in patient care, f. Strategies to be best student on the first clerkship, g. OSHA and hand hygiene, h. Proper professional attire, i. Completion of evaluations on residents and faculty. The students will complete credentials for major clinical sites.

**INTD 3058. Hospice and Palliative Medicine. 0 Credit Hours.**

This rotation offers clinical experience in Hospice and Palliative Medicine (HPM). Palliative care provides treatment for seriously ill hospitalized and ambulatory patients and focuses on symptom management, enhancement of function, physical comfort, quality of life, psychosocial support, and communication about the goals of medical care for the patients as well as their families.

**INTD 3091. Independent Study. 9 Credit Hours.**

Students will work directly with a faculty advisor or assistant dean to develop an independent plan of study.

**INTD 4007. Interprofessional Community Service Learning. 2 Credit Hours.**

This is an innovative interdisciplinary service learning (CSL) course offered in partnership with the UT School of Pharmacy, PHR 270S, to allow medical students to integrate meaningful community service with instruction, preparation, and reflection to enrich the learning experience, teach civic responsibility, and strengthen communities. This course will provide the opportunity for students to examine social justice and social determinant of health issues and apply these principles in a structured serviced learning practicum. The student-led service learning project will address the social and health needs of a community partner and will be conducted with the partner agency in a culturally competent manner. Through online learning modules, readings, and discussion; monthly class sessions; a group service learning project; and a structured service learning practicum, this course combines community service with preparation and reflection to foster civic responsibility in the health professions. Open for Cross Enrollment on Space Available Basis.

**INTD 4008. Interprofessional Care in HIV. 0.5 Credit Hours.**

Students will have the opportunity to learn how to function as a member of an interprofessional team in HIV case management. The objective is for students to become familiar with issues of patient safety, health literacy, medication reconciliation, and interprofessional teamwork in HIV care. This is an elective didactic course.

**INTD 4009. Interprofessional Care in HIV. 2 Credit Hours.**

Students will have the opportunity to learn how to function as a member of an interprofessional team in HIV case management, and become familiar with issues of: patient safety, health literacy, medication reconciliation, treatment guidelines, and interprofessional teamwork in HIV care.

**INTD 4011. Capstone I: Machine Learning and Artificial Intelligence for Health and Medicine. 4 Credit Hours.**

This course is intended as a stand-alone demonstration of AI principles for completion of the MS in AI dual degree program. Project topics include applied machine learning, neural networks, or natural language processing in health and medicine. The course aims to give students the minimal requisite skills to carry out an independent research project in ML and AI, train students to write up their findings and ideas accurately, and clearly and coherently present their own findings. Each student must have a mentor with a primary appointment in UTHSCSA, and an additional mentor with a primary appointment in UTSA (and adjunct appointment in Medical Education at UTHSCSA). Project topics and data may be given by assigned mentors which include but not limited to Patient Risk Identification, Imaging Classification (either digital pathology, or radiology), Clinical Trials Research, Basic research in the health sciences with parametric and non-parametric data. Prerequisites include: completion of the one-year didactic coursework through UTSA is required for the MS in AI program, students must have at least an introductory level of data science understanding with preparation for a standard data science workflow, knowledge of basic R/Python/MATLAB programming, and select mentors from UTHSCSA and UTSA.

**INTD 4012. Capstone II: Machine Learning and Artificial Intelligence for Health and Medicine. 4 Credit Hours.**

The primary learning objective of this elective is to prepare students for the advanced use of machine learning (ML) and artificial intelligence (AI) techniques in the professional health field. Successful completion of this course will provide students with knowledge of applications of ML and AI to health and medicine with quarter long project approved by the instructor and mentor. This course is a requirement for students enrolling in the MD/MS in AI dual degree program but is available to all medical students in good standing at the LSOM. If time allows, topics on more advanced theories of machine learning and artificial intelligence will be introduced. This course is a continuation of Capstone I. The course is intended to take the experience students gained in Capstone I and apply to an original/novel research idea in the data science domain. The course aims to give students the skills to conduct original research with a mentor, write up their findings in preparation for publication to a journal, and ultimately submit them for publication. Completion of Capstone II qualifies the student for an MS in AI with a thesis. Original/Novel research ideas may be given to students by their mentors, or they may choose a topic of their which will then be approved by both the mentors. The students must first complete Capstone I, and must have the same mentors as Capstone I and II unless a request is made and approved. Prerequisites for this course include completion of the one-year didactic coursework through UTSA is required for the MS in AI program. Students must also have at least an introductory level of data science understanding with preparation for a standard data science workflow, knowledge of basic R/Python/MATLAB programming, and select mentors from UTHSCSA and UTSA. Completion of INTD 4011: Capstone I; Machine Learning and Artificial Intelligence for Health and Medicine.



**INTD 4015. Humanism in Medicine Fellowship. 2 Credit Hours.**

This is a longitudinal 4th-year elective to support and nourish the inherent altruism of our students. This elective will bring together like-minded students and faculty who have a passion for caring for the medically underserved in their communities. The students will take a leadership role in managing and directing the student-run clinics at the Alpha Home, SAMM Transitional Living and Learning Center, Haven for Hope, Travis Park Dermatology (under faculty supervision). Clinical experiences will be at these clinics. This elective will include a few evening seminars throughout the year in which students and faculty meet to discuss social justice, how to start a free clinic, homelessness and topics chosen by the students. Every student will complete a project of their choice over the year.

**INTD 4018. Independent Elective in Ethics. 2 Credit Hours.**

In this longitudinal course, students will be required to undertake an independent study into a specific issue in medical ethics or medical humanities. Students will be required to read on research methods in medical ethics as well as literature in their issue of interest, and then to propose and conduct an original study project, a literature review, a position paper, or an ethical analysis of a particular topic or case. Students will be expected to write an academically rigorous final research report of 10 to 15 pages. Students will be encouraged to produce a final paper that can be submitted for publication in a peer-reviewed bioethics or medical humanities journal. Students will be required to meet with the instructor and/or chosen faculty advisor over the course for assistance, guidance, and discussion. (Center for Medical Humanities and Ethics).

**INTD 4019. Clinical Ethics. 2 Credit Hours.**

Students in this two-week course will have the opportunity to focus on work in clinical ethics consultation. The student will be required to participate in rounds as an ethicist, do in-depth reading on clinical ethics consultation, observe clinical ethics consults, attend ethics committee meetings, and provide an educational seminar to hospital staff on an issue of ethical significance.

**INTD 4025. Healthcare Practice and Policy Elective. 0.5 Credit Hours.**

The Healthcare Practice Elective is an introductory-level, discussion-based, eight-hour course targeted to fourth-year medical students. The course focuses generally on practice and policy issues of payment methodologies, cost-effectiveness, and access to care.

**INTD 4030. Serving Marginalized Communities: From local to global. 2 Credit Hours.**

This is a 2-week, in person course for 4th-year medical students who are planning future work in marginalized communities either locally or globally. This preparatory course uses a multidisciplinary, asset-based approach to provide a foundation of practical knowledge in community engagement to optimize the students' experiences, facilitate their adaptation to working in diverse settings, and maximize their impact in the communities where they serve. Topics include community partnerships and responsiveness to community needs, chronic and infectious illnesses of high burden in marginalized communities, prioritizing community resources, advocacy, health equity, ethical dilemmas, cultural humility, and professionalism. Course material is presented through a variety of approaches, including lectures, small-group case discussions, laboratory sessions, and online learning modules.

**INTD 4035. COVID-19 The Pathogenesis of a Pandemic. 2 Credit Hours.**

Students will be introduced to the novel coronavirus SARS-CoV-2 and the disease it causes, COVID-19. They will review emerging information pertaining to the virus and disease including virology, epidemiology and pathophysiology. They will also be engaged with material covering leadership principles, communication and social determinants of health. They will participate in online activities and discussions to further facilitate learning. This elective is completely online. Prerequisites: Completed MS1 and MS2 curriculum.

**INTD 4045. Patient Notes- Enrichment Elective. 0 Credit Hours.**

It is an interactive, inter-professional course that engages students in music listening sessions to teach students active listening skills. Through various forms of music, students will learn how to actively listen for specific details to gain insight on meaning, become comfortable with ambiguity and interpretation, and develop pattern recognition skills to quickly recognize deviation. Students will also develop stronger methodology for writing patients notes through conceptual practice of SOAP format notes for music pieces. Taught jointly by UTHSCSA faculty and professional musicians, this strategy of applying practical skills to an abstract concept such as music will refine these skills for students in clinical settings. Specifically, this course aims to improve interpersonal communication skills, and organizational note writing. This is also an opportunity for students to practice problems solving with other healthcare professionals.

**INTD 4048. Art Rounds. 2 Credit Hours.**

This is an interactive, interprofessional course that takes students to the McNay Art Museum to learn physical observation skills. Studies demonstrate that increased observational skills translate to improved physical examination skills. Using artwork as patients, students will have the opportunity to learn how to observe details and how to interpret images based on available evidence. Taught jointly by Health Science Center faculty and McNay museum educators, students will have the opportunity to develop and hone their observation, problem solving, and assessment skills. They will also observe, interpret, and give case reports on the original works of art to teach them the skill of verbalizing descriptions of what is seen, and not to accept assumptions made with a first impression. Open for Cross Enrollment on Space Available Basis.

**INTD 4058. Hospice and Palliative Medicine Elective. 4 Credit Hours.**

This rotation offers clinical experience in Hospice and Palliative Medicine (HPM). Palliative care provides treatment for seriously ill hospitalized and ambulatory patients and focuses on symptom management, enhancement of function, physical comfort, quality of life, psychosocial support, and communication about the goals of medical care for the patients as well as their families.

**INTD 4103. Communication Skills. 0.5 Credit Hours.**

To introduce fourth year medical students to the principles of conducting public interviews, presentations and effectively disseminating information to the communities they will serve.

**INTD 4104. Improving Patient Outcomes. 0.5 Credit Hours.**

This course is designed to increase a student's knowledge of and skills in identifying systemic problems with health care delivery and patient safety, collecting and analyzing data, generating solutions, presenting results and evaluating peers. The course objectives include facilitating systems thinking, exposing students to the ACGME general competencies (with emphasis on practice-based learning and improvement and systems-based practice), increasing understanding of health care economics and working in teams.

**INTD 4105. Medical Jurisprudence. 0.5 Credit Hours.**

The course will center on the Texas Medical Practice Act and applicable federal laws.

**INTD 4106. Practical Ethics For Healers. 0.5 Credit Hours.**

The course is the capstone of the four-year longitudinal curriculum in humanities and ethics. The goals are to reflect upon 1) physician's values, attitudes, and their intersection with cultural values and attitudes; 2) the historical and moral traditions of medicine in the context of society, politics, spirituality, and the health care system; and 3) the personal identity of a doctor. Open for Cross Enrollment on Space Available Basis.

**INTD 4107. The Skin Around Us: A View of Skin Disease from a Humanities Perspective. 4 Credit Hours.**

This elective is for fourth year medical students with a special interest in learning about skin diseases through a humanities perspective. Throughout the four week course, students will attend daily clinics, create a project and write an essay on activities encountered during the elective. The students will also complete brief writing assignments each week after watching videos, movies, and/or reading books.

**INTD 4108. Bridging the Gap: Transition from UME to GME. 4 Credit Hours.**

Medical education is changing with the introduction of a United States Licensure Medical Examination (USMLE) Step 1 scored on a pass/fail basis, increasing focus on the Undergraduate Medical Education to Graduate Medical Education transition, and changes to the residency application process. No longer can medical students wait until their senior academic year to prepare for USMLE Step 2 and discern their chosen specialty. In this course, which is to be delivered during the spring immediately prior to their senior year, medical students will be given instruction on specialty discernment and trained in test preparation techniques. Specialty discernment requires various forms of advising and mentoring. In this course, students will receive general instruction on the process of specialty discernment and will use online resources to prepare for residency applications in the context of academic metrics, specific program requirements, and specialty-based resources. The transition from undergraduate to graduate medical education is one of intense focus. While the transition seems as if it has a marked delineation, it exists on a continuum. In order to support the active process of creating goals, students need to reflect on their experiences as a clerkship student and create expectations of themselves in the context of their chosen specialty and career. Goal orientation in the context of mastery orientation defines success in terms of how well the knowledge, skills, and abilities have been demonstrated. (Cutrer, et al.) This type of goal orientation requires reframing and additional advising depending on the phase of the learner. Test preparation does not have to be separate and dedicated from the medical curriculum. In fact, directing learners to recognize opportunities to use exam preparation to build and apply more clinically-minded strategies, even when the content of the exam may not focus on clinical reasoning or diagnosis, might better prepare them to learn from their patients and to apply similar strategies later on. (Swan Sein, et al., 2021). By creating learning structures that facilitate this environment, medical students can use test preparation and test taking skills beyond the testing center. Prerequisites: at least 1 clerkship.

**INTD 4110. Getting Ready to Teach During Your Residency Program. 0.5 Credit Hours.**

The goal of this 8-hour course is to help senior medical students, who will be residents in a few months, develop teaching skills that will enhance the quality of their interactions with students. The course will be conducted in an interactive workshop format to allow participants to practice important teaching skills for residents. These include 1) orienting and priming students to their responsibilities and roles and accepting the personal role of teacher and role model, 2) giving feedback to improve student performance, 3) helping students to improve their patient presentations-the use of questioning, and 4) coaching procedural and technical skills. The participants will practice these skills and receive feedback from their course peers and instructors based on the guidelines for clinical teachers in action with students and provide critiques. Large and small group discussions and role plays will be used to reinforce teaching principles.

**INTD 4115. Advanced Electronic Health Record Training (EPIC Based). 4 Credit Hours.**

The primary learning objective of this elective is to prepare students for advanced use of the EPIC EMR in clinical and research environments. Successful completion of this course provides a formal certification as a Physician Builder in EPIC. That designation will permit students to take advantage of advanced features in EPIC as they advance in their careers. The course is broken down into two sections: Physician Builder-Basic and Physician Builder-Advanced. This course is a requirement for students enrolling in the MD/MS in AI dual degree program but is available to all medical students in good standing at the LSOM. Students must have a working familiarity with the EPIC EMR. One way to establish this familiarity is to have completed a clinical rotation in which EPIC EMR was utilized as a part of the assigned clinical work. Course fees: If the student is not part of the MD/MS in Artificial Intelligence dual-degree program, fee for the EPIC training course will need to be paid by student.

**INTD 4205. Veritas Mentors in Medicine Longitudinal Elective. 2 Credit Hours.**

This is longitudinal elective and the course work requirements will be for 2 week credit and must be complete by March 1st. Evaluation of MiM performance will include feedback from faculty mentors and students.

**INTD 4210. School of Medicine Research Elective Level 1. 4 Credit Hours.**

Medical research is multidisciplinary and broad in scope. Students will participate in basic, clinical research, quality improvement, or patient safety research projects under the supervision of faculty in the Health Science Center. The goal of this elective is to immerse students in a rich scholarly environment and provide an opportunity to work with research/faculty mentors to fully engage in a scholarly research process from writing the proposal to collecting the data to disseminating results. This elective is open to students who already have an established working relationship with a faculty member and who wish time to continue their work, students who wish to establish a new project, and for students who are in the MD-MPH degree program and MD with Distinction in Research Program. Interested students must submit a research elective application which includes the faculty mentor the student will work, to the office of UME, no later than 12 weeks before the research elective is to begin. Applications will be reviewed and confirmed or declined no later than 8 weeks prior to the proposed start date of the elective. Students will be able to 1) Formulate a research question and identify a research methodology to answer that question; 2) understand research ethics and apply an ethical approach to research design, implementation, and dissemination 3) design a research study and gather quality data; 4) apply and interpret basic biostatistics relevant to the individual research project; 5) write scientific reports. The supervising faculty member will evaluate the performance of the student using a standard, research specific, medical student evaluation form. Students will receive a Pass or Fail summative grade at the conclusion of the 4 week elective. Faculty will be expected to give the student formative feedback after two weeks to assist the student in meeting all expectations to pass the elective.

**INTD 4211. School of Medicine Research Elective Level 2. 4 Credit Hours.**

Medical research is multidisciplinary and broad in scope. Students will participate in basic, clinical research, quality improvement, or patient safety research projects under the supervision of faculty in the Health Science Center. The goal of this elective is to immerse students in a rich scholarly environment and provide an opportunity to work with research/faculty mentors to fully engage in a scholarly research process from writing the proposal to collecting the data to disseminating results. This elective is open to students who already have an established working relationship with a faculty member and reflects their increasing experience with the research process. INTD 4210 Level 1 elective or evidence of past experience knowledge and/or skills is a prerequisite. The expectation is that enrolled students will continue with research experiences begun in INTD 4210 Level 1 including students pursuing the MD-MPH degree and MD with Distinction in Research. Interested students must submit a research elective application which includes the faculty mentor the student will work, to the office of UME, no later than 12 weeks before the research elective is to begin. Applications will be reviewed and confirmed or declined no later than 8 weeks prior to the proposed start date of the elective.

**INTD 4212. School of Medicine Research Elective Level 3. 4 Credit Hours.**

Medical research is multidisciplinary and broad in scope. Students will participate in basic, clinical research, quality improvement, or patient safety research projects under the supervision of faculty in the Health Science Center. The goal of this elective is to immerse students in a rich scholarly environment and provide an opportunity to work with research/faculty mentors to fully engage in a scholarly research process from writing the proposal to collecting the data to disseminating results. Students enrolled in this course will have prior experience with research and ongoing research activities. As such, this elective is open to students who already have an established working relationship with a faculty member and reflects their increasing experience with the research process. INTD 4211 Level 2 elective is a prerequisite. As with INTD 4211 Level 2, the expectation is that enrolled students will continue with research experiences begun in INTD 4210 Level 1 and INTD 4211 Level 2 including students pursuing the MD-MPH degree and MD with Distinction in Research or produce evidence of past experience knowledge and/or skills which are deemed equivalent to these prerequisites. Interested students must submit a research elective application which includes the faculty mentor the student will work, to the office of UME, no later than 12 weeks before the research elective is to begin. Applications will be reviewed and confirmed or declined no later than 8 weeks prior to the proposed start date of the elective. Students will be able to formulate a research question and identify a research methodology to answer that question; understand research ethics and apply an ethical approach to research design, implementation, and dissemination; design a research study and gather quality data; apply and interpret basic biostatistics relevant to the individual research project; write scientific reports. The supervising faculty member will evaluate the performance of the student using a standard, research specific, medical student evaluation form. Students will receive a Pass or Fail summative grade at the conclusion of the 4 week elective. Faculty will be expected to give the student formative feedback after two weeks to assist the student in meeting all expectations to pass the elective.

**INTD 5005. Core Course 1: Biochemistry. 2 Credit Hours.**

Topics to be covered include: protein structure; properties of enzymes; structure, biosynthesis, and function of lipids; pathways and regulation of carbohydrate metabolism and biosynthesis and regulation of amino acids, nucleotides, and related compounds. Prerequisites: consent of instructor.

**INTD 5007. Advanced Cellular And Molecular Biology. 4 Credit Hours.**

This course provides an in-depth learning experience that instructs students on the fundamentals of molecular biology and cell biology as well as prepares the student to evaluate and design new research in the cutting-edge areas of modern molecular biology and cell biology. The course combines a didactic program of lectures along with a small group discussion format in which students interact closely with a group of faculty who have active research programs. The course focuses on active areas of research in molecular biology: Chromatin structure, DNA Transcription, DNA Replication and Repair, Recombination, RNA processing and regulation, Protein processing, targeting and degradation and in cell biology: Cell Signaling and Communication, Cell Growth, and Cell Death. Each week, the faculty provide students with didactic lectures on a current research area. Students and faculty will then jointly discuss key publications that serve to bridge the gap between the fundamental underpinnings of the field and the state of the art in that area.

**INTD 5013. Perio/Pros/Endo/Orth Interdisciplinary Course 1. 1 Credit Hour.**

A seminar that brings together the residents and graduate staff from the periodontic, prosthodontic, endodontic and orthodontic postdoctoral programs to share clinically relevant multidisciplinary information. Patient diagnostic evaluations and treatment plans are evaluated in an interactive environment. Selected topics involving new advancements are presented and discussed.

**INTD 5021. Dental Biomed Core 2. 1 Credit Hour.**

This course is a continuation of MSDS 5020 Dental Biomedical Core Course 1.

**INTD 5023. Research Ethics. 1 Credit Hour.**

The goal of this course is to provide the Master's student an opportunity to gain the essential standards necessary for training and education approved by the National Institute of Health. This course links to the web-based NIH Clinical Research Training On-Line Course <http://www.cc.nih.gov/training/training/crt/infor.html> for Principal Investigators that is required for all individuals conducting research. This course is open to current Health Science Center students. Open for Cross Enrollment on Space Available Basis.

**INTD 5031. Common Interprofessional Educational Experience - LINC. 0 Credit Hours.**

(1) Introduce students to IPE at UT Health San Antonio using the shared IPE framework as defined in the QEP (2) Facilitate interprofessional socialization (3) Prepare students for IPE activities they will experience as part of program-specific IPE plans.

**INTD 5032. TeamSTEPPS - Interprofessional Education Course. 0 Credit Hours.**

TeamSTEPPS is an evidence-based set of teamwork tools, aimed at optimizing patient outcomes by improving communication and teamwork skills among health care professionals.

**INTD 5035. UTeach. 2 Credit Hours.**

The course is designed for post-doctoral fellows, senior graduate students, faculty members, research staff and residents who are interested in a career in teaching and desire to acquire knowledge about learning processes and to develop educational planning, teaching and assessment skills to enhance their "teaching toolkit." UTeach (formerly University Teaching Excellence Course; UTEC) participants practice key skills needed for success in college-level teaching, working individually and in teams to accomplish course objectives. Classes will be supplemented by readings, worksheets and self-assessment inventories. Although the course will provide instruction in contemporary pedagogic techniques, it primarily emphasizes teaching science courses for undergraduates on campuses at predominantly undergraduate institutions (PUIs), rather than teaching graduate students and medical / dental students at the health science center (HSC) or other academic HSCs. Course instructors include faculty from the Schools of Medicine, Dentistry and Nursing at UTHSCSA as well as visiting faculty from local PUIs, St. Mary's University and Our Lady of the Lake University. UTeach has been offered for three consecutive fall semesters now (2015, 2016, 2017). It is sponsored by the San Antonio Biomedical Education and Research (SABER) Program that is supported by an Institutional Research and Academic Career Development Award (IRACDA) from the National Institute of General Medical Sciences of the NIH (PHS grant, K12 GM11726).

**INTD 5036. Simulation IPE Experience -- LINC. 0 Credit Hours.**

The LINC Simulation IPE Experience builds on the fall common IPE experience and occurs in the spring semester. Conceived and supported by the LINC Academic Affairs Council and housed within the LINC Faculty Councils Didactic IPE Initiative, the purpose of this university-wide IPE activity is threefold: (1) introduce students to simulation at UT Health San Antonio; (2) facilitate interprofessional socialization; and, (3) prepare students for IPE activities they will experience as part of program-specific IPE plans. Students complete the LINC Simulation IPE Experience in interprofessional groups of 3-4. Interactivity is emphasized as student groups work through 5 hours of instruction, including interprofessional socialization activities, mini-lectures, illustrated case studies, video case studies, and interprofessional discussions rooted in problem-based learning. Prerequisites: INTD 5031.

**INTD 5040. Fundamentals Of Neuroscience1: Molecular, Cellular, & Developmental Neuroscience. 2 Credit Hours.**

This course is intended to introduce students to a broad survey of the basics of molecular, cellular and developmental neuroscience. The course is organized into a series of three modules: biochemical and cellular properties of nervous system cells, development of neuronal systems, and neurotransmission and neuromodulation, which covers the fundamentals of these three areas. Current topics and concepts are discussed in discussion sessions that include student participation. Two components; Neuroscience students register for both PHYL 5041 and INTD 5040.

**INTD 5043. Fundamentals Of Neuroscience 2: Systems Neuroscience. 3 Credit Hours.**

This course, the second component of our broad survey of the basics of neuroscience, begins at the level of the neural circuit, and guides the students through an understanding of increasingly complex levels of organization and function in the brain. Topics include neurotransmitter systems, sensory and motor function, motivated behavior, regulation and integration of autonomic, behavioral, and emotional responses in the limbic system, higher order cognitive processes, and the neurobiological basis underlying some important psychiatric disorders and their treatment.

**INTD 5046. Metanalysis In Cognitive Neuroimaging. 2.5 Credit Hours.**

The objective of this course is to familiarize students with human functional brain imaging methods, experimental designs, statistical analyses, inferential strategies, and content. Students are guided through a literature-based research project that culminates in a quantitative metanalysis of a set of studies using similar tasks.

**INTD 5047. Neuroanatomy. 2 Credit Hours.**

The purpose of this course is to provide students with a practical working knowledge of the structure of both the peripheral and central nervous system. The emphasis will be on the organization of the human brain, although the brains of other species may also be included if appropriate for a specific brain region. The course will look at each of the individual components of the central nervous system in some depth but will also emphasize the complex integration of these various components into a functional brain. The topics covered in the course are specifically designed to mesh in time with those covered in Fundamentals of Neuroscience 2 describing the function of these areas. For this reason, it would be best if these two courses were taken concomitantly. The course will be didactic with digital images, models, and wet specimens included in the course.



**INTD 5051. Research Methodology and Evidence-Based Practice. 2 Credit Hours.**

This course is designed to introduce dental residents and faculty to critical thinking, research methodology, and evidence-based practice skills.

**INTD 5064. Applied Statistics for Health Care Practitioners. 3 Credit Hours.**

This online course focuses on the application of descriptive and inferential statistics in research studies. Students are expected to gain knowledge and skills that will enable them to understand, interpret, and evaluate statistical results; work with a consultant statistician; and use software to enter, analyze, and summarize data. Course requirements include homework assignments, online discussions and/or chats, and periodic projects.

**INTD 5066. Laughter is the Best Medicine: An Interdisciplinary Elective about Humor, Healing, and Healthcare. 1 Credit Hour.**

This class is a serious look at humor! The physiological and psychological benefits of humor, as well as its therapeutic use with patient interactions, will be explored. Students will learn how to develop and improve their personal use of humor to combat burn out, through techniques to enhance coping skills and stress reduction. Student participation and interaction is integral to the content delivery.

**INTD 5067. Introduction to Programming for Biologists. 3 Credit Hours.**

This course covers fundamentals of computer programming. It is designed and tailored for biologists in three ways: 1) students can pass it with minimal mathematical background, 2) when possible, examples and exercises are based on biological data analyses, and 3) it prepares students for other courses that are focused on bioinformatics techniques and tools. The topics are similar to the first introductory course that a student would take in a computer science program including: An introduction to Unix operating systems (i.e., Linux and macOS), basic command line and terminal usage; The Emacs text editor; Using simple data structures including vectors, matrices, lists, and classes; Conditional statements; Loops; Functions; Debugging; Organizing computational biology experiments and Code repositories and version control systems including Git. While this course is based on R, students are expected to be able to self-teach other high-level programming languages including Python, Matlab, etc. after learning fundamentals of programming in this course. Students will learn skills that are essential for visualization, statistical analysis, machine learning, analyzing next generation sequencing data, and other bioinformatics analyses. Open for Cross Enrollment on Space Available Basis.

**INTD 5074. Topics In Translational Medical Product Development. 1 Credit Hour.**

It is crucial to understand the intricate process of translating basic research into market driven products, navigate the complex pathways of intellectual property management and the regulatory affairs of agencies such as the FDA. This course will offer students in biomedical sciences the opportunity to integrate industry-relevant training and experience with their basic science education. The course will explore the marketing and regulatory process by which a biomedical product is developed and brought to commercialization.

**INTD 5075. Complementary Healthcare for the Clinician. 0 Credit Hours.**

The goal of this elective is to introduce future doctors to practices outside of the classical medical school curriculum that promote an evidence-based approach to wellness. This is so that the medical students of the UTHSC School of Medicine are informed about the reality, evidence and rumor surrounding a variety of commonly used alternative and supplementary healthcare practices. The of this class is not to make the student an expert in areas such as acupuncture or yoga, but to be well informed of the role of such practices as it relates to patient treatment and wellness. To this end, all the classes will have a practical component which will allow the students to experience the alternative modalities in a structured setting.

**INTD 5081. Topics In Cardiovascular Research. 1 Credit Hour.**

This course is designed to familiarize students with the current literature related to cardiovascular disease. Each week a different research topic selected from the recent literature is presented and discussed. Students are expected to attend and participate in the discussions. In addition, students are required to prepare and present once during the semester. A list of previous and current course presentations will be available online.

**INTD 5082. Responsible Conduct of Research. 1.5 Credit Hour.**

This foundational course introduces students to core ethical content necessary for responsible research conduct. Through interactive seminars, students will learn about (1) scientists as responsible members of society (contemporary ethical issues in biomedical research and environmental/social impacts of research), (2) policies for research with human subjects and vertebrate animals, (3) collaborative research, (4) conflicts of interest (personal, professional, financial), (5) data acquisition and laboratory tools (management, sharing, ownership), (6) responsible authorship and publication, (7) mentor/trainee responsibilities and relationships, (8) peer review, and (9) research misconduct (forms of misconduct and management policies).

**INTD 5091. Special Topics. 1-4 Credit Hours.**

This is a placeholder course, for which graduate students may register, if they are unable to select a specific track core course at the time of registration. Tracks are: Biology of Aging, Cancer Biology; Cell and Molecular Biology; Genetics, Genomics, & Development; Membrane Biology & Cell Signaling; Metabolism & Metabolic Disorders; Microbiology & Immunology; Molecular Biophysics & Biochemistry; Molecular, Cellular, & Integrative Physiology; Neuroscience; and Pharmacology. The course may be repeated for credit.

**INTD 5094. Independent Study. 1-4 Credit Hours.**

This elective allows for detailed in-depth study in a specific area of study. The area and mode of study are to be agreed upon by the student and instructor. The course may be repeated for credit when the area of study varies. Clock hours are to be arranged. Prerequisites: Graduate standing and consent of instructor.

**INTD 5101. Health, Equity and the Environment. 1 Credit Hour.**

This course will introduce IPE to UT Health San Antonio (UTHSA) students through an elective course called, Health, Equity and the Environment that will focus on knowledge of environmental health disparities and skills that empower students to actively work to reduce disparities and promote wellbeing in their patients and communities. The purpose of this course is to determine the impact of the IPE course on developing IPE teams/teamwork and communication competencies relative to environmental health knowledge and its intersection with health equity. UTHSA students will complete IPE competencies pre-post surveys, a course evaluation and conduct a community service learning (CSL) activity to evaluate their understanding of IPE and environmental health and inequities. Open for Cross Enrollment on Space Available Basis.

**INTD 6002. Ethics In Research. 0.5 Credit Hours.**

This course covers topics relevant to ethics in scientific research. The course is taught on a case-study basis, dealing with real and hypothetical situations relevant to the conduct of scientific research. Topics discussed will include, but will not be limited to: data management, peer review, recognizing scientific misconduct, authorship, and The University of Texas regulations relevant to human and animal research. This course is required of all doctoral graduate students.

**INTD 6007. Advanced Cell Biology. 2 Credit Hours.**

This course provides an in-depth learning experience that instructs students on the fundamentals of cell biology as well as prepares the student to evaluate and design new research in the cutting-edge areas of modern cell biology. The course combines a didactic program of lectures along with a small-group discussion format in which students interact closely with a group of faculty who have active research programs. The course focuses on active areas of research in cell biology: Cell Signaling and Communication, Cell Growth, and Cell Death. Each week, the faculty jointly discuss key publications that serve to bridge the gap between the fundamental underpinnings of the field and the state of the art in that area. Students and faculty will then jointly discuss key publications that serve to bridge the gap between the fundamental underpinnings of the field and the state of the art in that area.

**INTD 6008. Mitochondria & Apoptosis. 1 Credit Hour.**

This course will focus in depth on Mitochondria and Apoptosis. Topics will include: Mitochondria and Respiration; Mitochondria and Reactive Oxygen Species; Mitochondria and Apoptosis. It will provide an opportunity for a unique learning experience where the student can prepare to evaluate and design new research in the cutting-edge areas of modern cell biology and molecular biology. Instead of a didactic program of lectures, the entire course comprises a small-group format in which students interact closely with a group of faculty who have active research programs. Each week, faculty will provide students with a brief overview of the research area. Students and faculty will then jointly discuss key publications that serve to bridge the gap between the student's prior understanding of the field and the state of the art in that area.

**INTD 6009. Advanced Molecular Biology. 2 Credit Hours.**

This course will provide an in-depth learning experience on the fundamentals of molecular biology as well as prepare the student to evaluate and design new research in the cutting-edge areas of modern molecular biology. The course combines a didactic program of lectures along with a small-group discussion format in which students interact closely with a group of faculty who have active research programs. The course focuses on active areas of research in molecular biology: Chromatin structure, Transcription, DNA Replication and Repair, Recombination, RNA processing and regulation, Protein processing, targeting and degradation. Each week, the faculty provide students with didactic lectures on a current research area. Students and faculty then jointly discuss Key publications that serve to bridge the gap between the fundamental underpinnings of the field and the state of the art in that area.

**INTD 6011. Introduction To Science Of Teaching. 1 Credit Hour.**

This course will provide insight into the basic skills of learning and teaching. Faculty from the Academic Center for Excellence in Teaching and the Graduate School will provide the opportunity to learn the skills, strategies, and experiences for a future in academia and teaching. Topics include lecture presentations on why scientists choose to teach, planning a student learning experience in addition to developing a lecture syllabus, curriculum and teaching portfolio and philosophy. The course is recommended for Supervised Teaching Course INTD 6071.

**INTD 6014. Perio/Pros/Endo/Orth Interdisciplinary Course 2. 1 Credit Hour.**

This seminar brings together the residents and graduate staff from the periodontic, prosthodontic, endodontic and orthodontic postdoctoral programs to share clinically relevant multidisciplinary information. Patient diagnostic evaluations and treatment plans are evaluated in an interactive environment. Selected topics involving new advancements are presented and discussed.

**INTD 6019. Pharmacotherapeutics. 1 Credit Hour.**

This course is designed to review general principles of pharmacology; current and accepted pharmacotherapy for the medical management of pain, infection, and selected systemic diseases; and associated adverse drug events. It is based on the top 200 drugs dispensed by U.S. community pharmacies for the prevention, diagnosis, and/or treatment of disease with special reference to dentistry.

**INTD 6035. Introduction to R and Unix/Linux. 0.5 Credit Hours.**

Computational biology is a rapidly emerging subfield of biomedical science. Acquiring basic computational skills will enable biologists to better understand and analyze "big data" and use novel approaches to answer biological questions. In addition, it will improve communication with computational scientists and bioinformaticians, thereby enhancing collaborations. The course consists of two modules. The first 5-week module is designed to gain familiarity with R coding. The second 3-week module covers working in the Unix/Linux environment and the use of shell scripts. This course will be taught in the form of interactive hands-on computer classes in combination with homework assignments. No prior knowledge of programming or coding is required. This course is designed to prepare students for more advanced computational biology course work, such as INTD 6062 and CSAT 6095. Open for Cross Enrollment on Space Available Basis.

**INTD 6037. Analytical Methods in Biomedical Research. 1 Credit Hour.**

This three-week interactive course introduces students to fundamental methodologies used to analyze cells and biomolecules including nucleic acids and proteins. Principles, procedures, advantages and limitations of routinely used methods will be discussed. By the end of this course, the student should be able to: Define the principles and procedures underlying cell culture, isolation of cell organelles, cell proliferation, tissue embedding, sectioning and staining, define the principles and procedures underlying methods to quantify and manipulate nucleic acids, define the principles and procedures underlying methods to quantify proteins and determine protein-protein interactions, list the common methodologies used to generate mouse models for biomedical research.

**INTD 6038. Biomedical Fundamentals. 3 Credit Hours.**

This course will cover diverse topics in molecular and cell biology, physiology, immunology and neuroscience including innate and adaptive immunity, cell signaling, protein trafficking, cell adaptation and cell death, stem cells, and membrane physiology. Interactive lectures based on a flipped classroom approach will be followed by small group presentations and discussions focusing on critically evaluating scientific publications relevant to the lecture. The course will also include student presentations of their ongoing research. By the end of this course, a student should be able to: explain in-depth the topics covered during the course, describe and discuss research publications in a wide variety of disciplines within the life sciences, critically analyze, interpret and evaluate scientific publications or presented research updates, identify and present emerging topics in their field of interest (as defined by the research of their mentor). The course is for PREP-UT Health Link students.

**INTD 6040. Resident Lecture Series in Psychiatric Disorders and Psychopharmacology. 1 Credit Hour.**

This is an interdisciplinary advanced elective in which students attend 17 lectures from the Psychiatry Year One Residents' lecture series. These lectures focus on the psychopathology, epidemiology, and pharmacological treatments for illnesses such as schizophrenia, anxiety disorders, trauma related disorders, eating disorders, and sleep disorders.

**INTD 6041. Basic Science Resident Lecture Series In Neurology. 1.5 Credit Hour.**

This is an interdisciplinary advanced elective in which students attend 20 lectures, selected from the full offering of daily one-hour lectures comprising the Neurology Residents' Basic Sciences lecture series. These lectures cover a range of topics, such as Epilepsy, Movement Disorders, the Thalamus, Parkinson's Disease, Alzheimer's Disease, Stroke, Sleep, etc., all given from a clinical perspective. In addition, graduate students will have the opportunity to observe or participate in at least two enrichment activities related topically to the lectures they attend, which may include such settings as case presentations, diagnostic training sessions, or clinical observations, again selected from the list of offerings included in the "Neurology Residents" series.

**INTD 6045. Clinical Practicum In Neuroscience. 1 Credit Hour.**

This course will provide students with a brief, but intense and very focused exposure to clinical practice in a relevant area of their choosing, designed and coordinated to best match their interests in close individual collaboration with a clinical mentor in one of the participating components: Neurosurgery, Neurology, Psychiatry, or Endodontics. Representative activities could include participation in case presentation and treatment planning, attending rounds with physicians and residents, direct observation of clinical procedures, patient interviews, follow-up care and outcome review. Potential venues may include inpatient psychiatric ward, sleep clinic, epilepsy clinic, stroke clinic, neurosurgical theater and surgical ICU. In consultation with the course director, students will first select one of the following sub-sections, then design their individually tailored clinical practicum experience with the coordinator for that section.

**INTD 6046. Resident Lecture Series in Psychiatric Disorders and Psychopharmacology II. 1 Credit Hour.**

This is an interdisciplinary advanced elective in which students attend lectures, selected from the full offering of weekly two-hour lectures comprising the Psychiatry Year One Residents' lecture series. These lectures cover a range of topics, such as Substance Abuse, Depression, Bipolar Disorder, etc., all given from a clinical perspective.

**INTD 6062. Next-Generation Sequencing Data Analysis. 2 Credit Hours.**

Next-generation sequencing (NGS) is becoming increasingly commonplace in biomedical research. For many labs, the main bottleneck to implementing NGS applications is data analysis. This course is designed to introduce students to bioinformatics analysis of NGS data. The course consists of two modules: the first module covers working in the Unix/Linux environment, mapping NGS data to a genome of interest, and performing downstream analysis of RNA-seq, ChIP-seq, and ATAC-seq data. The second module will be an introduction to the programming language Perl, which will enable students to perform custom bioinformatics analysis. This course will be taught in the form of interactive hands-on computer classes. No prior knowledge of programming or coding is required.

**INTD 6070. Teaching Excellence And Academic Skills (Texas). 1 Credit Hour.**

This course, designed to assist graduate students and faculty in acquiring teaching skills, is composed of four modules, each covering a range of topics from lecture and clinical teaching to instructional development to assessing student achievement.

**INTD 6075. Practical Machine Learning. 2 Credit Hours.**

This practical approach to machine learning in the biomedical sciences will be mostly problem set- and discussion-based. Background information will be delivered in short lectures on datasets and machine learning concepts. Our plan is to discuss encoding data, training models, and evaluating model performance, including dimensionality reduction, regularization to reduce overfitting, and optimization of method hyperparameters through grid and random searches, with models drawn from linear and logistic regression, random forest classifiers, multi-layer perceptrons, neural networks (feed-forward, recurrent, graph, convolutional, and adversarial), and variational auto-encoders. Each problem set will cover a different area, including chemical structures and properties, metabolite profiles and cancer diagnosis, DNA sequence and transcription factor binding sites, and intratumoral gene expression and patient survival. One problem set and one 2-hour discussion (30 minutes lecture, 30 minutes concept discussion, 1hr problem set progress discussion) every week. The final problem set will be a capstone project where the students implement methods of their own choosing and compete to achieve the best model performance. Open for Cross Enrollment on Space Available Basis.

**INTD 6076. Translational Biomedical Product Development. 1 Credit Hour.**

Translational Biomedical Product Development is a course that will provide students with an understanding of the overall process of translating basic research into innovative, market-driven biomedical products (therapeutics, biologics, diagnostics, and devices). It covers the complex pathways of intellectual property management and the regulatory processes by which a bioscience product is developed and brought to commercialization. Focused lectures will include pre-clinical development, patenting, FDA and regulatory requirements, clinical trials, marketing, funding, licensing, and commercialization strategies. Case studies of both successful and unsuccessful biomedical products will be presented to explore various business development opportunities. Upon successful completion of this course, students will have a comprehensive knowledge of the complex regulatory ecosystem of biomedical product development and management. Prerequisites include appropriate undergraduate courses in Biochemistry, Molecular Biology or Pharmacology, as assessed by the course director. Prerequisites: BIOC 6035 Open for Cross Enrollment on Space Available Basis.

**INTD 6097. Research. 0.5-12 Credit Hours.**

This course is intended for first-year IMGP students only. Students will be required to attend a minimum of 10 departmental (any) seminars during the semester and submit a 100-150 word synopsis of each seminar within two weeks of the seminar.

**INTD 6115. Perio/Pros/Endo/Ortho Interdisciplinary Course 3. 1 Credit Hour.**

This is a seminar that brings together the residents and graduate staff from the periodontic, prosthodontic, endodontic and orthodontics postdoctoral programs to share clinically relevant multidisciplinary information. Patient diagnostic evaluations and treatment plans are evaluated in an interactive environment. Selected topics involving new advancements are presented and discussed.

**INTD 7001. Flow Cytometry: Principles and Applications. 2 Credit Hours.**

This course will cover the principles of flow cytometry, the components of cell analyzers and cell sorters, the applications of different assays in flow cytometry and the interpretation of flow cytometry data. Flow cytometry plays an essential role in helping to elucidate cell phenotype characterization and function in both clinical and research settings. The purpose of this course is to bring students up-to-date on the technology of flow cytometry and to help them gain knowledge in how to apply this tool for patient diagnosis as well as basic and translational research.

**INTD 7002. Neurobiology Of Learning And Memory. 1 Credit Hour.**

This course will focus on recent findings and topics related to the underlying aspects of the neural basis of learning and memory. Students will have the opportunity to learn about: molecular basis of memory formation, consolidation and retrieval, memory and emotion, associative learning, memory and amnesia, and recognition memory and the medial temporal lobe. The lectures will be interactive and driven by discussions of key journal articles. Each week the first hour will be reserved for lecturing and the second hour will be reserved for a discussion of a journal article.

**INTD 7003. Elective in International Medicine. 4 Credit Hours.**

This elective serves as a vehicle for students to participate in international medicine rotations. Students will work with a faculty sponsor to identify a program, either a pre-established site or a site discovered by the student which requires faculty approval. This elective includes: 1) The Center for Medical Humanities and Ethics International Scholars Program in India, a competitive program requiring a separate application through the department of Medicine, 2) Shoulder to Shoulder program in Latin America, which requires a separate application process and some cost (airfare and small project fee), and is available October, January, and April, 3) Programs in Nicaragua, Mexico, Panama, and Guatemala, and 4) Other sites available through online directory: <http://www.globalhealth-cc.org/GHEC/Resources/GHonline.htm>. All rotations share a commitment to service learning - medical education and self-reflection that arises out of service to needy populations. Students spend up to 4 weeks (or possibly longer) living in an international site and participating in the care of patients, under the supervision of local and visiting health care providers. The clinical settings and caseload will vary based on the location. There may be opportunities for patient education and emphasis on efforts of local empowerment, aiming to build up the communities in a sustainable way. Students will be expected to integrate themselves into the health care delivery system, and when possible, to strive to make an impact through community education and home visits. For certain Latin American sites, fluency in Spanish is a prerequisite. Students are encouraged to seek similar service learning experiences with underprivileged populations in San Antonio and Border communities prior to or after the rotation. End of rotation "reflection essays" are required and will serve to process student experiences.

**INTD 7005. Indian Health Care Preceptorship. 4 Credit Hours.**

This elective offers the opportunity for an experience in the health care of Native Americans, coordinated through the Indian Health Service. Most experiences involve both inpatient and outpatient care under direct supervision of board certified family physicians or internists. Educational activities such as conferences, teaching rounds, etc., may vary from site to site. All clinical sites are located outside the state of Texas, including sites in New Mexico, Arizona and Alaska. Early application is recommended. Students completing appropriate application forms may be reimbursed for transportation costs and provided room and board by the Indian Health Service.

**INTD 7006. Biomarkers in Health Care Research and Delivery. 1 Credit Hour.**

This course provides a broad overview of the rapidly evolving use of biomarkers in health care research and health care delivery. Biomarkers are non-subjective (i.e., not symptom scores, disability scales, or diagnoses) physical or functional measurements that serve as quantitative indices of physiological processes, pathological processes, and responses to exposures or interventions (including therapeutic interventions) that are intended to enhance the rigor and reproducibility of health care research and care delivery. Federal agencies, including the Food and Drug Administration (FDA), the National Institutes of Health (NIH) and the Institute of Medicine (IOM) are deeply engaged in promoting the use of biomarkers, introducing multiple funding opportunities for biomarker development toward FDA qualification and/or regulatory approval for clinical use. Additionally, opportunities for commercial partnership during biomarker development will be discussed. Examples will be provided of fluid (serum, CSF, urine, etc.), tissue, imaging, and biometric biomarkers (including wearable devices). Course format will emphasize assigned readings/viewings from various sources (IOM white papers, FDA & NIH video and powerpoint presentations, recent biomarker validation publications, current biomarker qualification submissions, relevant regulatory guidance, funded-grant synopses, et cetera) followed by in-class review and discussion. Special topic lectures will be delivered by invited speakers ranging from established biomarker researchers to regulatory experts. Open for Cross Enrollment on Space Available Basis.

**INTD 7007. Medicine through Literature. 2 Credit Hours.**

In this course you are required to read short stories, poems, and a book of nonfiction. While many of the stories or poems directly address medical or ethical issues, the primary purpose is not to enhance your store of knowledge in these areas, but to promote your appreciation of these works through discussions with other students (online via Canvas discussions and in class) and with authors and lecturers. Your own contributions to the course - not just the insights you've gained as medical students but the wisdom you bring to the class as human beings - will be critical to its success. We hope that the readings will help you prepare for and process your clinical experiences, furthering your development as a person as well as physician. There will be no "right" or "wrong" answers in this course; rather, our goal is to encourage thoughtful and serious responses to the readings and a lively and fulfilling conversation about them and the issues they raise. MSIV students will receive two credits for completion of this longitudinal elective. All students are expected to participate in class discussions. Grades are earned by reading assignments, attendance at class meetings, and posting primary and secondary responses to posted discussion questions. Open for Cross Enrollment on Space Available Basis.

**INTD 7020. Clinical Patient Management. 5 Credit Hours.**

This course is designed to help students develop skills in clinical behavioral dentistry through small group discussions, lectures, and routine patient treatment by application of the principles of coordinating patient care; communicating effectively with colleagues, staff, and faculty; and managing time, records, and environment. The students are required to manage their comprehensive care patients in the Junior Clinic following the principles presented in this course.



**INTD 7074. Topics In Translational Medical Product Development. 1 Credit Hour.**

It is crucial to understand the intricate process of translating basic research into market driven products, navigate the complex pathways of intellectual property management and the regulatory affairs of agencies such as the FDA. This course will offer students in biomedical sciences the opportunity to integrate industry-relevant training and experience with their basic science education. The course will explore the marketing and regulatory process by which a biomedical product is developed and brought to commercialization.

**INTD 7091. Independent Studies. 1-9 Credit Hours.**

Students will have the opportunity to use this course to study for the National Board, Part II examination, according to their own need. This course also will serve as a framework for a student returning from a leave of absence or from other protracted time away from classes or clinic. At the conclusion of the course, the enrolled student must demonstrate knowledge and/or skills and/or values consistent with the expectations for entering the level of course study from which the student left. An individualized course of study will be developed once the student is enrolled.