MDTS - Medical Diagnostic and Translational Sciences

MEDICAL DIAGNOSTIC AND TRANSLATIONAL SCIENCES Courses

MDTS 400/500, Principles of Molecular Pathology and Clinical Diagnostics. 3 Credits.
Basic concepts of molecular pathology & clinical diagnostics including nucleic acids, DNA replication, transcription, proteins, mutations and chromosome changes that underlie inherited and acquired/infectious disease, inheritance patterns and genetics as applied to oncology, cardiac disease and organ transplants. Covers emerging molecular/cytologic/histologic methods (amplification, hybridization and microarrays) to detect disease markers, monitor therapy and assess identity; pharmacogenomics and legal/ethical issues of genetic testing. Prerequisites: BIOL 240 or BIOL 250, BIOL 241 or BIOL 251; CHEM 211, CHEM 212 and permission of instructor.

MDTS 401/501, Molecular Diagnostics Laboratory. 3 Credits.
Course includes hands-on experience with or discussion of diagnostics instrumentation and assays using nucleic acid and protein extraction, gel electrophoresis, hybridization techniques, standard and real time polymerase chain reaction PCR), reverse transcription, DNA sequencing, autoradiography, flow cytometry, microarrays and proteomics-based methods. Pre- or corequisite: MLRS 400 or permission of the instructor.

MDTS 500. Principles of Molecular Pathology and Clinical Diagnostics. 3 Credits.
Basic concepts of molecular pathology and clinical diagnostics including nucleic acids, DNA replication, transcription, proteins, mutations and chromosome changes that underlie inherited and acquired/infectious disease, inheritance patterns and genetics as applied to oncology, cardiac disease and organ transplants. Covers emerging molecular/cytologic/histologic methods (amplification, hybridization and microarrays) to detect disease markers, monitor therapy and assess identity; pharmacogenomics and legal/ethical issues of genetic testing. Prerequisites: permission of instructor.

MDTS 501. Molecular Diagnostics Laboratory. 3 Credits.
Course includes hands-on experience with or discussion of diagnostics instrumentation and assays using nucleic acid and protein extraction, gel electrophoresis, hybridization techniques, standard and real time polymerase chain reaction PCR), reverse transcription, DNA sequencing, autoradiography, flow cytometry, microarrays and proteomics-based methods. Pre- or corequisite: MDTS 500 or permission of instructor.

MDTS 600. Advanced Clinical Applications of Molecular Diagnostics. 3 Credits.
Course will cover 1) new applications of standard molecular diagnostic techniques and 2) cutting edge technologies, instrumentation and technical advances, both as applied to clinical case studies. Emphasis will be on pharmacogenomics and disease processes including inherited conditions, cancer, hematopathology, infectious diseases, mental retardation and developmental delay. Innovative technologies covered include comparative genomic hybridization, pyrosequencing and bead based assays Prerequisites: MLRS 500, MLRS 501 or permission of instructor.

MDTS 601. Advanced Molecular Diagnostics Laboratory. 3 Credits.
Emphasis of this course will be on primer design for PCR, advanced real time PCR, cycle sequencing, capillary electrophoresis (CE) as applied to DNA sequencing, analysis of SNPs (single nucleotide polymorphisms), microsatellite instability, microarray technology and detection of methicillin-resistant bacteria. Prerequisites: MDTS 500, MDTS 501 or permission of instructor. Pre- or corequisites: MDTS 600.

MDTS 608. Clinical Laboratory Internship. 3 Credits.
An optional three-week supervised rotation in a hospital-based molecular diagnostic laboratory or a molecular research laboratory. Prerequisites: MDTS 500, MDTS 501, MDTS 600, and MDTS 601 or permission of instructor.