

## BMD Plan of Study – (Sample) Spring Start

<b>1<sup>st</sup> Semester Spring Courses:</b>			
<b>Course</b>	<b>Credits</b>	<b>Title</b>	<b>Type</b>
-BMD 513	4	Principles of Diagnostic Technology: Immunoassays	Core Course (Must be taken in the 1st semester)
-BMD 514	3	Principles of Diagnostic Technology: Molecular Diagnostics	Core Course
<b>Fall Courses:</b>			
<b>Course</b>	<b>Credits</b>	<b>Title</b>	<b>Type</b>
-BMD 502	3	Foundations of Biomedical Informatics Methods I	Core Course
-BMD 667	3	Regulation of Medical Diagnostics	Core Course
-*Elective	3	Elective 1: Elective Options Below	Elective Option
<b>Spring Courses:</b>			
<b>Course</b>	<b>Credits</b>	<b>Title</b>	<b>Type</b>
-BMD 511	3	Health Economics, Policy and Payment Models	Core Course
-*Elective	3	Elective 2: Elective Options Below	Elective Option
-BMD 592	2	(Research) Biomedical Diagnostics	Core Course/Culminating Course - Must take semester prior to BMD 593 (Pre-Requisites: BMD 502, 511, 513, 514, 667)
<b>Summer Courses:</b>			
<b>Course</b>	<b>Credits</b>	<b>Title</b>	<b>Type</b>
-BMD 510	3	Current Perspectives in Biomedical Diagnostics	Core Course (Pre-Requisites: BMD 502, 511, 513, 514, 667)
-BMD 593	3	Applied Project (AP)	Culminating Course (Pre-Requisite: A Passing grade in BMD 592)
<b>30</b>		<b>Total Credits for Master's Degree in Biomedical Diagnostics</b>	

\*Elective Options: Pick 2 Courses Listed Below (Total: 6 elective credits). Student can take electives in either Fall or Spring Terms.

<b>Course</b>	<b>Credits</b>	<b>Title</b>	<b>Semester</b>
-BMI 598	3	Biomedical Commercialization	Fall
-BMI 598	3	Entrepreneurship in Biomedicine	Spring
-BMI 598	3	Imaging in Diagnostics	Spring
-BMD 550	3	Translational Bioinformatics	Spring
-BMD 598	3	Biomedical Device Design Principles: Hands-on Work	Spring

Other ASU Requirements:

- Students must be enrolled each Fall/Spring term to maintain registration
- Students must maintain a 3.0 GPA (in all 3 areas – graduate, iPOS, and cumulative GPA's)
- Grades of D or E are not allowed to be used on a graduate iPOS (plan of study)

## BMD Course Descriptions

### Core Courses:

**BMD 502 Foundations of Biomedical Informatics Methods I (3 credits)** Survey the methods and theories underlying the field of biomedical informatics. The course explores techniques in mathematics, logic, decision science, computer science, engineering, cognitive science, management science and epidemiology, and demonstrates the application to healthcare and biomedicine.

**BMD 510 Current Perspectives in Biomedical Diagnostics (DCU course) (3 credits)** This course provides an overview of the Biomedical Diagnostics Industry covering research, policy and legal aspects of the field. Visiting speakers from ASU, Biomedical Diagnostics companies, and regulatory agencies will provide an overview of their specialty based on personal experience and case studies. Students will have the opportunity to engage in discussion boards with speakers and peers from Dublin City University.

**BMD 511 Health Economics, Policy and Payment Models (3 credits)** Provides a thorough grounding in selected microeconomic concepts and models that are relevant for the economic aspects of health care but also have more general applications. The concepts and methods are applied to a selected set of topics that include the public provision of health insurance, benefit-cost and cost effectiveness analysis, human capital models of investments in health, incentives and the legal approach to medical malpractice and current approaches to methods of payment for health care services.

**BMD 513 Principles of Diagnostic Technology: Immunoassays (DCU course) (4 credits)** The purpose of this module is to provide a detailed understanding of the theory and applications of advanced diagnostic assay systems and devices. In this module students will gain knowledge in immunoassay design and validation with particular attention to the manipulation of the immune system for disease recognition. This module assumes no former knowledge of immunology, but some knowledge would be advantageous.

**BMD 514 Principles of Diagnostic Technology: Molecular Diagnostics (3 credits)** Primer on nucleic acid structure, genome types, RNA, mutations, molecular diagnostics platforms, applications such as infectious disease, cancer, pharmacogenomics, risk management, current technologies such as DNA amplification, probes, DNA sequencing, mRNA expression levels, sample preparation, methods on the horizon.

**BMD 667 Regulation of Medical Diagnostics (3 credits)** This course explores the regulatory environment for the development, marketing, access and interpretation of modern biomedical diagnostics. Students will explore the business environment of diagnostic firms, interactions with state and federal regulatory authorities, and how new types of diagnostics and business models challenge established approaches for safeguarding the validity and safety of new products and service.

### Research & Culminating Experience:

**BMD 592 Research (2 credits)** Biomedical Diagnostics Independent study in which a student, under the supervision of a faculty member, conducts research that is expected to lead to a specific project such as a thesis or dissertation, report, or publication. Assignments might include data collection, experimental work, data analysis, or preparation of a manuscript.

**BMD 593 Applied Project (3 credits)** Students will complete an experiential learning experience as part of their applied project on a topic of relevance to the diagnostics field and their career interests. A one faculty member committee will work with the student to select an appropriate topic, supervise progress, and evaluate the project. Applied projects will demonstrate students' ability to apply skills and knowledge learned in coursework, use research methods appropriate to the field, and report and present results.

### Elective Courses:

**BMD 550 Translational Bioinformatics (3 credits)** Provides an introduction to bioinformatics methods and applications used in the field of translational medical research. Topics include bioinformatics data acquisition and management, analysis methodologies, and applications.

**BMI 598 Biomedical Commercialization (3 credits)** This course is designed to provide students with a real world perspective of the challenges faced by those trying to commercialize new diagnostics technologies. Diagnostics are used (or not used) today. The course will focus on the current environment. Students will also have an opportunity to interact with recognized experts in the field of clinical laboratory, business, legal, reimbursement, regulatory, professional society and wearable device communities during guest lectures.

**BMD 598 Biomedical Device Design (3 credits)** Medical Device Design is a hybrid class/lab where a mixture of lecture, hands on, demos, lab experiments are used to convey the breadth of medical devices in the medical diagnostic device industry. Classification of devices and function are explained and covered. Students will learn, reverse engineer and build simple devices as well as learn about the FDA, market, business and design side of these products.

**BMI 598 Entrepreneurship in Biomedicine (3 credits)** The Entrepreneurship and Commercialization Specialty program is designed to produce the next biomedical entrepreneurs. These entrepreneurs will be uniquely positioned to identify new opportunities for innovation, by learning the process of developing a business plan, identifying clinical and market potential, and fundraising while initiating the process of invention, patenting, prototyping which lead to successful commercialization.

**BMI 598 Imaging in Diagnostics (3 credits)** This course gives an introduction to imaging informatics, covering imaging modalities (CT, MRI, Ultrasound, PET, etc), PACS (picture archiving and communication systems), RIS (radiology information systems), and the basic of image analysis and computer-aided diagnosis in medical imaging.