APPLIED BIOTECHNOLOGY (ABT)

ABT 7000 Principles of Biotechnology 3 Credits
Introduction to basic principles and techniques pertaining to biotechnology and its applications to our society. Survey of Classical and emerging techniques.
Components: Class

ABT 7050 Ethics, Safety and Regulatory Environment in Biotechnology 3 Credits
Ethical and safety concerns in development, production, funding and application of biotechnology. Analysis of socioeconomic impacts. Understanding the importance of data integrity. Overview of risk assessment and management in a regulatory environment designed to ensure safety of workers, study subjects and patients and protect intellectual property, data and the environment.
Components: Class

ABT 7100 Professional and Technical Communication in Biotechnology 3 Credits
Application and analysis of professional scientific communication, both written and oral. Focuses on designing documents that convey complex, data-rich technical and scientific content to audiences with diverse information needs using a variety of professional genres, including reports, proposals, presentations and documentation.
Components: Class

ABT 7150 Techniques in Biotechnology 3 Credits
Application of biological and chemical methods to modern biotechnologies product development. Overview of analysis techniques used to characterize products and evaluate quality and safety. Exploration of technological pipeline from conception to market, including proof of concept assessment, pre-clinical trials, clinical trials and post production testing.
Components: Class
Prereqs/Coreqs: P. ABT 7000

ABT 7200 Experimental Design and Analysis in Biotechnology 3 Credits
Principles of description and inferential statistics with applications in biotechnology including experimental design, quantitative data analysis and bioinformatic evaluation of complex molecular and biological data sets.
Components: Class

ABT 7250 Leadership in Organizations 3 Credits
Focuses on strategies and tools that manages use to maximize employee contribution and create organizational excellence. Basic business and leadership principles. Best practices to overcome biases that inhibit organizations and teams from communicating effectively. Examples will come from diverse biotechnology fields, including pharmaceutics, agriculture and biotechnology services.
Components: Class

ABT 7300 Python for Bioinformatics 3 Credits
Introduce diverse strategies for computational analysis of macromolecular data using Python including sequence alignment, genome annotation, data retrieval from databases, phylogenetic analysis, and molecular evolution. Experiential learning is emphasized; confidence in practical skills is developed through persistent application of course content to projects focused on current problems in bioinformatic research.
Components: Class

ABT 7350 Quality Control and Validation 3 Credits
Focuses on the importance of quality control and validation in biotechnology product design, development and manufacturing. Explores quality systems and documentation, global quality standards and methods for assessing validation including installation, operational and performance qualifications. Overview biomanufacturing processes, automation and cGLP/cGMP practices necessary to meet quality standards.
Components: Class
Prereqs/Coreqs: P. ABT 7000, ABT 7050 and ABT 7100

ABT 7400 Regulatory Practice and Compliance 3 Credits
Identifies and examines the key regulatory agencies and practices that govern the highly regulated and diverse biotechnology industry, both domestically and internationally. Highlights current and emerging FDA and ICH regulations and guidance documents to successfully navigate meeting with the agencies and to submit required documentation for successful product development.
Components: Class
Prereqs/Coreqs: P. ABT 7000, ABT 7050 and ABT 7100

ABT 7450 Industrial Applications in Regulatory Affairs 3 Credits
Examines the global regulatory environment in risk-based assessment of biotechnological developments across diverse sectors, ensuring consumer and environmental protection. Addresses how validation is essential to the incorporation of emerging technologies into viable, accessible and successful products. Highlights the stakeholders' role in regulatory oversight and policy through relevant industry case studies.
Components: Class
Prereqs/Coreqs: P. ABT 7000, 7050, and 7100

ABT 7500 Biotechnology Marketing and Entrepreneurship 3 Credits
Examines marketing case studies in diverse area of biotechnology. Addresses marketing fundamentals and strategies, communicating value proposition strategy, ethical and regulatory concerns, startup strategies, pharmaceutical marketing, b2b marketing, salesforce development. branding and promotion. Culminates with the creation of a marketing plan/analysis.
Components: Class

ABT 7550 Global Operations and Supply Chain Management 3 Credits
Forces on the strategic importance of operations and supply chain to overall performance relevant to a variety of business processes specific to biotechnology. Topics include production, transportation, distribution systems, sourcing and purchasing.
Components: Class

ABT 7600 Quality and Project Management 3 Credits
Quality and project management issues and roles during different phases from RD to market. Introduction to installation qualification, operation qualification and process qualification (IQ/OQ/PQ). Project management phases: conceptualizing, planning, executing and closing. Project schedule and time management tools and techniques. Project requirements including quality assurance.
Components: Class
Prereqs/Coreqs: P. ABT 7200 and ABT 7250

ABT 7650 Assessing Innovation in Biotechnology 3 Credits
A survey of biotechnology assessments in areas such as regenerative medicine, agricultural biotechnology and bioremediation. Course links disciplines with the critical evaluative role played by scientific discovery, market valuation, intellectual property, freedom to operate (FTO) and licensing strategy by assess the role each play in the commercialization of a specific technology.
Components: Class
Prereqs/Coreqs: P. ABT 7000

ABT 7700 Product Development 3 Credits
Explores strategies in evaluating and implementing new technologies or products in the context of different bioindustries. Identifies considerations in product valuation, feasibilities of production, scalability and supply chain management. Models the process of business growth and innovation through integration of emerging technologies.
Components: Class
Prereqs/Coreqs: P. ABT 7000 and ABT 7150

ABT 7750 Tools for Data Analysis 3 Credits
Using a variety of existing and emerging bioinformatics tools and computational methods, emphasizes hands-on experiences analyzing and interpreting large data sets (e.g. genomic, proteomic, microbiomics, interactome, target discovery). Students will also evaluate and adapt existing computational approaches for specific use in solving a problem in biotechnology.
Components: Class
Prereqs/Coreqs: P. ABT 7050 and ABT 7150

ABT 7800 Bioinformatic Inquiry 3 Credits
Advances the development of competencies promoting efficient analysis of biological data. Emphasizes matching a research problem with the most effective tools for its completion, balancing use of existing software and de novo software development. Advanced aspects of Python and R, algorithmics, machine learning, simulations, and effective communication of results are emphasized.
Components: Class
Prereqs/Coreqs: P. ABT 7200 and ABT 7300

ABT 7850 Applications of Bioinformatics 3 Credits
Exploration and application of existing bioinformatic tools. Implementation of pre-coded solutions to data acquisition, wrangling, analysis, visualization, and structural modeling problems. Students will complete a project that generates a multi-system workflow to solve bioinformatic problems.
Components: Class
Prereqs/Coreqs: P. ABT 7200 and ABT 7300

ABT 7890 Pre-capstone 1 Credit
Prepares the student for applied self-directed capstone experience. Addressing problem identification, research and project formulation. Culminates in an oral and written proposal with project schedule.
Components: Class
Prereqs/Coreqs: P. ABT 7000, ABT 7050, ABT 7100, ABT 7150, ABT 7200, ABT 7250; One of: ABT 7350, ABT 7400, ABT 7450, ABT 7500, ABT 7550, ABT 7600, ABT 7650, ABT 7700, ABT 7750

ABT 7900 Capstone 3 Credits
Student will complete a project (report, business plan, program etc.) in an area of quality assurance and compliance, business and management and/or research and development. Culminating in a substantive body of work, executive summary and reflection. Networking and communication in a professional capacity is expected.
Components: Class
Prereqs/Coreqs: P. ABT 7890