BMTH - BIOMATHEMATICS (BMTH)

BMTH 199 - Professional Experience 1 Credit

Hours: 1R-0L-1C
Term Available: S
Graduate Studies Eligible: No
Prerequisites: None

The professional experiences course captures the practical work experiences related to the student's academic discipline. Students are required to submit a formal document of their reflections, which communicates how their employment opportunity reinforced and enhanced their academic studies.

BMTH 295 - Research Seminar in Biomathematics 1 Credit

Hours: 1R-0L-1C
Term Available: See Department
Graduate Studies Eligible: No
Prerequisites: None

A seminar-style course that introduces novel problems in biomathematics. Problems will be drawn from the modern literature in biomathematics, computational biology, bioinformatics, systems biology, and biostatistics. This course may be taken at most twice for credit.

BMTH 301 - Introduction to Biomathematics: Continuous Models 4 Credits

Hours: 4R-0L-4C
Term Available: S
Graduate Studies Eligible: No
Prerequisites: MA 212 or MA 222

This course requires no previous knowledge of biology. The application of differential equations and probability to modeling and analyzing dynamic biological systems. Mathematical topics include ordinary and partial differential equations, dynamical systems, bifurcations, limit cycles, chaos, and probabilistic and stochastic modeling. Biological applications may include biochemistry, cell biology, epidemiology, neuroscience, ecology, biofluids, biomaterials, diffusion, and pattern formation.

BMTH 302 - Introduction to Biomathematics: Discrete Models 4 Credits

Hours: 4R-0L-4C
Term Available: S
Graduate Studies Eligible: No
Prerequisites: MA 113

This course requires no previous knowledge of biology.The application of discrete mathematics and computational algebra for modelling biological phenomena. Topics may include: gene regulatory networks, genomics, RNA folding, neuronal networks, infectious disease modeling, phylogenetics, and/or ecological networks. Students will also use software currently used in mathematical biology research for visualization, simulation, and analysis.

BMTH 310 - Mathematical Biology 4 Credits

Hours: 4R-0L-4C
Graduate Studies Eligible: No
Prerequisites: MA 211 and MA 212

BMTH 311 - Systems Biology 4 Credits

Hours: 4R-0L-4C
Term Available: See Department
Graduate Studies Eligible: No
Prerequisites: MA 212 or MA 222

The study of how to combine detailed biological information to build models of entire systems. Nearly any biological scale can be considered. For example, at the biochemistry level the course will consider topics such as gene regulatory networks, protein interaction networks, and metabolisms. Moving toward larger scales, systems biology can be used to study the growth of cancerous tumors, and on an even larger scale, the mating and social structure of populations. The course's focus is on how to use relational information to perform model based inquiries of an entire system.

BMTH 312 - Bioinformatics 4 Credits

Hours: 4R-0L-4C
Term Available: See Department
Graduate Studies Eligible: No
Prerequisites: (CSSE 120 or CSSE RA120) and MA 381

This course will study how to combine mathematical, statistical, probabilistic, and computational methods to analyze biological data. Example topics are sequence alignment, locating genes, structural alignment, microarray analysis, and drug design. The course emphasizes how to search and compare biological datasets to make scientific inferences.

BMTH 413 - Computational Biology 4 Credits

Hours: 4R-0L-4C
Term Available: See Department
Graduate Studies Eligible: Yes
Prerequisites: MA 332 and (BMTH 310 or BMTH 301 or BMTH 311 or BMTH 312)

The study of how to build and validate computational models to conduct biological studies. Ex-emplary topics include molecular dynamics, haplotyping, phylogenetics, neuroscience, and population dynamics. The course will consider the implementation and analysis of algorithms that are specifically germane to the life sciences.

BMTH 490 - Topics in Biomathematics 1-4 Credits

Hours: 0R-0L-(1 - 4)C
Term Available: F
Graduate Studies Eligible: No
Prerequisites: None

Varies

BMTH 496 - Capstone Experience I 2 Credits

Hours: 0R-0L-2C
Term Available: F
Graduate Studies Eligible: No
Prerequisites: None

Independent study in a thesis project to be directed by a faculty member. The project and faculty adviser are to be identified prior to starting BMTH 496, and a plan of study is to be agreed upon by the student and adviser prior to the initiation of the thesis sequence. The thesis will culminate in a written report and a public presentation/defense that will be evaluated by a thesis committee consisting of at least the adviser and two other members of the faculty. BMTH 496/497/498 must be taken in consecutive quarters.

BMTH 497 - Capstone Experience II 4 Credits

Hours: 0R-0L-4C
Term Available: W
Graduate Studies Eligible: No
Prerequisites: BMTH 496

Independent study in a thesis project to be directed by a faculty member. The project and faculty adviser are to be identified prior to starting BMTH 496, and a plan of study is to be agreed upon by the student and adviser prior to the initiation of the thesis sequence. The thesis will culminate in a written report and a public presentation/defense that will be evaluated by a thesis committee consisting of at least the adviser and two other members of the faculty. BMTH 496/497/498 must be taken in consecutive quarters.

BMTH 498 - Capstone Experience III 2 Credits

Hours: 0R-0L-2C
Term Available: S
Graduate Studies Eligible: No
Prerequisites: BMTH 497

Independent study in a thesis project to be directed by a faculty member. The project and faculty adviser are to be identified prior to starting BMTH 496, and a plan of study is to be agreed upon by the student and adviser prior to the initiation of the thesis sequence. The thesis will culminate in a written report and a public presentation/defense that will be evaluated by a thesis committee consisting of at least the adviser and two other members of the faculty. BMTH 496/497/498 must be taken in consecutive quarters.