EBIO 100. Intro to Biological Engr. 2 Credits. (1 Lec, 1 Lab) F
COREQUISITE: M 151Q or above. An introduction to engineering measurements, computations, problem solving, and experimental design. Discussion of the breadth of opportunities in chemical and biological engineering. Cross-listed with ECHM 100.

EBIO 216. Elem Princ of Bioengineering. 3 Credits. (3 Lec) F
PREREQUISITE: ECHM 201, M 172Q. Fundamentals of energy balances in biological engineering applications.

EBIO 290R. Undergraduate Research. 1-6 Credits. (1-6 Ind; max unlimited) F
PREREQUISITE: Consent of instructor. Directed undergraduate research/creative activity which may culminate in a written work or other creative project. May be repeated.

EBIO 291. Special Topics. 1-4 Credits. (1-4 Lec; 12 cr max) On Demand
PREREQUISITE: None required but some may be determined necessary by each offering department. Courses not required in any curriculum for which there is a particular one-time need, or given on a trial basis to determine acceptability and demand before requesting a regular course number.

EBIO 292. Independent Study. 1-3 Credits. (1-3 Ind; 6 cr max) On Demand
Maximum 6 cr. PREREQUISITE: Consent of instructor and approval of the Associate Dean. Directed research and study on an individual basis.

EBIO 324. Bioengineering Transport. 3 Credits. (3 Lec) F
PREREQUISITE: EBIO 216, ECHM 321. Fundamentals of the phenomena governing the transport of momentum, energy, and mass in biological systems.

EBIO 396. Turkish Bioengineering Electives. 3 Credits.

EBIO 407. Biological Engineering Thermodynamics. 3 Credits. (3 Lec) F
PREREQUISITES: M 274 and CHMY 211 and ECHM 216. Principles of thermodynamics, conservation of energy and phase equilibrium applied to living systems and biological processes.

EBIO 411R. Biological Engineer Design I. 3 Credits. (2 Lec) F

EBIO 412R. Biological Engineer Design II. 3 Credits. (2 Lec) F
PREREQUISITE: EBIO 411R. Senior capstone course. Design and simulation of chemical engineering equipment, processes and plants.

EBIO 438. Bioprocess Engin. 3 Credits. (3 Lec) S
PREREQUISITE: ECHM 201. Biotechnology process engineering - microbial process fundamentals, enzyme catalysis, bioreactor design and analysis, separation of biomaterials.

EBIO 439. Downstream Processing. 3 Credits. (3 Lec) S

EBIO 442. Bioengineering Lab I. 3 Credits. (1 Lec, 2 Lab) F
PREREQUISITE: EBIO 324, EBIO 438, EGEN 350. Students will develop an experimental objective and experimental design to meet a particular objective. Independently investigate the relevant theory for a proposed experiment, analyze data for statistical significance, draw conclusions from the experimental data. They will then effectively communicate the technical information through written reports. Cross-listed with ECHM 442.

EBIO 443. Bioengineering Lab II. 3 Credits. (1 Lec, 2 Lab) S
PREREQUISITE: EBIO 442. Students will develop an experimental objective and experimental design to meet a particular objective. Independently investigate the relevant theory for a proposed experiment, analyze data for statistical significance, draw conclusions from the experimental data. They will then effectively communicate the technical information through written reports.

EBIO 461. Principles of Biomedical Engineering. 3 Credits. (3 Lec) S
PREREQUISITE: ECHM 321 or consent of instructor. An overview of biomedical engineering including the application of engineering principles to the design of products and processes in the health industries. Topics include ethics, biomechanics, biomaterials, bioinstrumentation, biosensors, pharmacokinetics, and tissue engineering.

EBIO 490R. Undergraduate Research. 1-8 Credits. (1-8 Ind; 12 cr max) F,S,Su
PREREQUISITE: Senior Standing and consent of instructor. Directed undergraduate research/creative activity which may culminate in research paper, journal article, or undergraduate thesis. Course will address responsible conduct of research. May be repeated.

EBIO 491. Special Topics. 1-3 Credits. (1-3 Lec; 12 cr max) On Demand
PREREQUISITE: Course prerequisites as determined for each offering. Courses not required in any curriculum for which there is a particular one-time need, or given on a trial basis to determine acceptability and demand before requesting a regular course number.

EBIO 492. Independent Study. 1-3 Credits. (1-3 Ind; 6 cr max) On Demand
Maximum 6 cr. PREREQUISITE: Junior standing, consent of instructor and approval of department head. Directed research and study on an individual basis.

EBIO 498. Internship. 1-12 Credits. (1-12 Ind; 12 cr max) On Demand
PREREQUISITE: Junior standing, consent of instructor and approval of associate dean. An individualized assignment arranged with an agency, business or other organization to provide guided experience in the field.

EBIO 566. Fundamentals of Biofilm Engr. 3 Credits. (3 Lec) F
PREREQUISITE: M 274. Development of quantitative descriptions of processes of microbial growth, diffusive and convective solute transport, and cell attachment and detachment. Integration of these processes in mathematical models of biofilm accumulation and activity. Application of these approaches to the analysis of biofilms in diverse industrial and natural environments.

EBIO 575. Research or Prof Paper Project. 1-4 Credits. (1-4 Ind; 6 cr max) On Demand
Maximum 6 cr. PREREQUISITE: Graduate standing. A research or professional dealing with a topic in the field. The topic must have been mutually agreed upon by the student and his or her major advisor and graduate committee. Directed research and study on an individual basis.

EBIO 590. Master's Thesis. 1-10 Credits. (1-10 Ind) F,S,Su
PREREQUISITE: Master's standing.

EBIO 591. Special Topics. 1-4 Credits. (1-4 Lec; 12 cr max) On Demand
Maximum 12 cr. PREREQUISITE: Upper division courses and others as determined for each offering. Courses not required in any curriculum for which there is a particular one-time need, or given on a trial basis to determine acceptability and demand before requesting a regular course number.

EBIO 592. Independent Study. 1-4 Credits. (1-4 Ind; 8 cr max) On Demand
Maximum 6 cr. PREREQUISITE: Graduate standing, consent of instructor, approval of department head and Dean of Graduate Studies. Directed research and study on an individual basis.

EBIO 594. Seminar. 1 Credit. (1 Sem)
PREREQUISITE: Graduate standing or seniors by petition. Course prerequisites as determined for each offering. Topics offered at the graduate level which are not covered in regular courses. Students participate in preparing and presenting discussion material. Cross-listed with ECHM 594.

EBIO 598. Internship. 2 Credits. (2 Int) F,S,Su
Maximum 6 cr. PREREQUISITE: Graduate standing, consent of advisor and approval of department head. An individualized assignment arranged with an agency, business, or other organization to provide guided experience in the field.

EBIO 690. Doctoral Thesis. 1-10 Credits. (1-10 Ind; 10 cr max)
PREREQUISITE: Doctoral standing.

EBIO 691. Special Topics. 1-4 Credits. (1-4 Lec; 12 cr max) On Demand
PREREQUISITE: Doctoral standing.

EBIO 694. Seminar. 1 Credit. (Sem)
PREREQUISITE: Graduate standing or seniors by petition. Course prerequisites as determined for each offering. Topics offered at the graduate level which are not covered in regular courses. Students participate in preparing and presenting discussion material. Cross-listed with ECHM 694.

EBIO 696. Doctoral Thesis. 1-10 Credits. (1-10 Ind; 10 cr max)
PREREQUISITE: Doctoral standing.

EBIO 698. Internship. 2 Credits. (2 Int) F
Maximum 6 cr. PREREQUISITE: Graduate standing, consent of advisor and approval of department head. An individualized assignment arranged with an agency, business, or other organization to provide guided experience in the field.

EBIO 699. Doctoral Thesis. 1-10 Credits. (1-10 Ind; 10 cr max)
PREREQUISITE: Doctoral standing.

EBIO 709. Seminar. 1 Credit. (Sem)
PREREQUISITE: Graduate standing or seniors by petition. Course prerequisites as determined for each offering. Topics offered at the graduate level which are not covered in regular courses. Students participate in preparing and presenting discussion material. Cross-listed with ECHM 709.

EBIO 790. Directed Research. 1-8 Credits. (1-8 Ind; 12 cr max) F,S,Su
PREREQUISITE: Doctoral standing and consent of instructor. Directed undergraduate research/creative activity which may culminate in research paper, journal article, or undergraduate thesis. Course will address responsible conduct of research. May be repeated.
Font Notice

This document should contain certain fonts with restrictive licenses. For this draft, substitutions were made using less legally restrictive fonts. Specifically:

Times was used instead of Adobe Garamond Pro.

The editor may contact Leefrog for a draft with the correct fonts in place.