Graduate

	Course Description	Credits	Term	Frequency
BEE 512 Physical Hydrology	Principles of hydrologic processes and the integration of these processes into the hydrologic cycle. Topics include atmospheric processes, precipitation and runoff, storm response in streamflow on a watershed scale, and major concepts in groundwater systems. PREREQS.: One year of calculus.	3	Fall	Annually
BEE 525/CE 540 Stochastic Hydrology	Study the elements of randomness embedded in the hydrological processes with emphasis on time series analysis, stationarity, periodic/trend component, stochastic component, time series synthesis, ARMA model, spatial sampling and scale variability. Offered alternate years. PREREQS.: BEE 512	3	Spring	Biannually
BEE 529 Biosystems Modeling Techniques	Development of mathematical models of biological and ecological systems; linear and nonlinear systems analysis; stochastic modeling and random processes; model solution and analysis techniques.	3	Winter	Annually
BEE 533 Irrigation System Design	Principles of soil physics and plant water use applied to irrigation system design. Design of gravity, pressurized, and trickle irrigation systems, improving on-farm water management, performance characteristics of pumps and other irrigation equipment. Lect./lab. Offered alternate years.	4	Spring	
BEE 542 Vadose Zone Transport	Introduction to the physical and hydraulic properties involved in flow from the soil surface to groundwater. Classical infiltration equations will be derived and presented with exact and approximate solutions. Attention is focused on application to pollutant transport and recent advances in non-ideal flow. Recommended PREREQS.: MTH 254	4	Fall	Biannually (Odd Years)
BEE 544/ CE 640 ST Open Channel Hydraulics (currently offered by CE dept.)	Contact Civil Engineering department for course information.	3	Winter	Biannually
BEE 545 Sediment Transport	Principles of sediment erosion, transportation and deposition in rivers, reservoirs, and estuaries; measurement, analysis, and computational techniques. Offered alternate years. Recommended PREREQS..: CE 313	4	Winter	Biannually

Course	Description	Credits	Term	Frequency
BEE 546 River Engineering	Multipurpose river use; natural physical processes in alluvial rivers; channel modification practices; river structures; design practices; impact of river modification; problem analysis; and impact minimization. Offered alternate years. PREREQS..: CE 313	4	Spring	Biannually (Odd Years)
BEE 549 Regional Hydrologic Modeling	Challenges in regional-scale water resource analysis and management with emphasis on application to production agriculture. Application of geostatistical techniques to spatially variable systems and remote sensing to large-scale water resource systems. Development of soil-water-atmosphere-plant models. Analysis of evapotranspiration estimating methods. Offered alternate years.	3	Winter	Biannually
BEE 558 Nonpoint Source Pollution	Problem solving in nonpoint source pollution. Methods for evaluating the extent, rate, timing, and fate of Non-Point Source (NPS) pollutants in agricultural and urban environments. Offered yearly in Spring term, as a hybrid section for even years and an Ecampus section for odd years.	3	Spring	Annually
BEE 572 Intro to Food Engineering Principles	This course is the first in a two-course sequence for non-engineering majors. BEE 572 provides principles of mass and energy conservation plus fundamentals of fluid flow dynamics as applied to food processing operations.	5	Fall	Annually
BEE 585 Metabolic Systems Engineering	Mathematical and experimental techniques for quantitative descriptions of microbial bioreaction processes and an introduction to the principles and methodologies of metabolic engineering. Pre-requisites: Differential equations, linear algebra, biochemistry.	3	Spring	
BEE 590 Bioprocess Control Systems	Analysis and control of biological and biochemical systems. Stability, observability, controllability, pole-placement methods. Introduction to optimal control and feed back systems. PREREQS.S..: MTH 251 and MTH 306 and BEE 571 or equivalent.	3	Spring	Biannually
BEE 599 Environmental Transport and Mixing	Mathematical foundations and analytical solutions of the advection dispersion equation in environmental systems. Students will learn to describe and analyze reactive and passive material transport in soils, rivers and lakes. Students must have a familiarity with calculus and partial differential equations.	3	Spring	Annually

Course	Description	Credits	Term	Frequency
BEE 599 (formerly BEE 578) Biofuel Feedstocks Production	Bioethanol is one of the important alternatives to fossil fuels. This course will provide an overview of the biofuel feedstock for production of fuels, feed and industrially valuable chemicals. Issues in feedstock utilization such as suitability, availability, sustainability and economic viability will be addressed. This course will cover the preprocessing, post processing and fermentation technologies in ethanol production. Influence of feedstock composition and process technologies on ethanol and coproducts will be discussed.	3	Winter	Annually
BEE 691 Advanced Bioproduct Systems - Microbial Fuel Cells	Fundamentals of fuel cell. Electricity generating microorganisms. Electron transfer mechanism microbial fuel cell (MFC). Parameters for evaluating MFC performance. MFC reactor configuration. Potential applications of MFC. Production of hydrogen using microbial-electrolyzer (adapted MFC); fundamentals of electrolyzer; factors affect the bio-electrolyzer performance and reactor configuration; comparison with other H2 generation technologies.	2	Fall	Biannually