2009 - 10 CHECKLIST: Biological Systems Engineering
Food & Bioprocess Engineering Specialization

Student: _____ Student ID: _____ Telephone No.: _____

2009-10 Course Requirements for BSE Degree – *Courses Common to All Option Areas*

Courses in this table are not to be included in calculations used to check the 2.35 GPA program entrance requirement

Crds	Sem/Yr Taken	Grade	Requirement	Course Taken to Meet Requirement
			University Communication A Course	
			University Communication B Course	
			Ethnic Studies Course (minimum of 3 credits of any e classified course)	
			Humanities Courses (minimum of 6 credits of H, L or Z classified courses	
			Social Science Course (minimum of 3 credits of any S or Z classified course that is not an Econ or AAE course)	
			International Studies Course (minimum of 3 credits from required list. Course can be used to meet any other curriculum requirement)	
			Economics Course (AAE 215, ECON 101, 102 or 111)	

Free Electives

Courses in this table are not to be included in calculations used to check the 2.35 GPA program entrance requirement

Crds	Sem/Yr Taken	Grade	Course

2009-10 Course Requirements for BSE Degree – *Courses Common to All Option Areas*

All courses in this table must be included in calculations used to check the 2.35 GPA program entrance requirement

Crds	Sem/Yr Taken	Grade	Requirement	Course Taken to Meet Requirement
			MATH 221 (5) Calculus and Analytic Geometry	
			MATH 222 (5) Calculus and Analytic Geometry	
			MATH 234 (3) Calculus—Functions of Several Variables	
			Intro Statistics for Engineers (STAT 224 (3) or 324 (3))	
			Chemistry (Chem 109 (5) or Chem 103 (4) and Chem 104 (5)	
			Comp Sci 310 (3) Problem Solving.	
			Agr. and Life Science Course (min. of 3 crds from required list)	
			Biological Sciences (min. 3 crds from required list)	
			E M A 201 (3 crds) Statics	
			Physics 202 (5) General Physics	
			Engineering Graphics Course (M E 170 (2) or M E 231 (2))	
			Thermodynamics (M E 361 (3) or CBE 211(3))	
			Engineering Economics Course (ISYE 313 (3) or M E 314(3) or ACCT I S 300 (3) or FINANCE 300 (3))	
			BSE 249 (3) Engr. Principles for Biological Systems or CBE 250 (3)	
			BSE 364 (3) Engr. Properties of Food and Biological Materials	
			BSE 365 (3) Measurements and Instrumentation for Biol Systems	
			BSE 375 (3) Biological Concepts for Engineers	
			BSE 409 (1) Career Management for Engineers	
			BSE 509 (3) BSE Senior Design	

200910 Course Requirements for BSE Degree – *Food and Bioprocess Engineering Specialization*

All courses in this table must be included in calculations used to check the 2.35 GPA program entrance requirement

Crds	Sem/Yr Taken	Grade	Requirement	Course Taken to Meet Requirement
			BSE 441 (3) Rheology of Foods & Biomaterials	
			BSE 542 (3) Food Engineering Operations	
			BACT 325 (3) Food Bacteriology	
			BIOCHEM 501 (3) Introduction to Biochemistry	
			CBE 320 (4) Introductory Transport Phenomena	
			FOOD SCI 410 (3) Food Chemistry I	
			FOOD SCI 532 (4) Integrated Food Manufacturing	
			CBE 326 (3) Momentum and Heat Transfer Operations or M E 364 (3) Elementary Heat Transfer	
			BSE Breadth Course (351 (3), 356 (3), 367 (3), 372 (2), 460 (3), 472 (3), 473 (2), 475 (3), 476 (3), 571 (3))	
			CHEM 341 (3) or 343 (3) Organic Chemistry (Chem 341 recommended)	
			Technical Elective	
			Technical Elective	
			Technical Elective	
			Technical Elective	
			Technical Elective	
			Technical Elective	
	TOTAL– *Minimum 44 Credits Required*			

2009-10 Course Requirements for BSE Degree – *Food and Bioprocess Engineering Technical Electives*

The following courses can be used to meet technical elective requirements for the Food and Bioprocess Engineering specialization

Area	Course
Biomedical, Bioengineering, Biomedical	B M E 310 (3) Bioinstrumentation
	B M E 315 (3) Biomechanics
	B M E 401 (3) Physics for Medicine and Biology
	B M E 430 (3) Biological Interactions with Materials
	B M E 461 (3) Modeling of Physiological Systems
	B M E 505 (3) Biofluidics
	B M E 530 (3) Medical Imaging Systems
	B M E 547 (3) Biomedical Optics
	ECE 230 (4) Circuit Analysis
	ECE 330 (3) Signals and Systems
Processing	CBE 311 (3) Thermodynamics of Mixtures
	CBE 324 (2) Transport Phenomena Lab
	CBE 426 (3) Mass Transfer Operations
	CBE 430 (3) Chemical Kinetics and Reactor Design
	CBE 560 (3) Biochemical Engineering
	CBE 562 (3) Special Topics in Chemical Engineering
	CBE 565 (3) Food Process Engineering
	BSE 642 (2) Food and Pharmaceutical Separations
Rheology	M S E 271 (2) Materials Science and Engr. Problem Solving I
	M S E 350 (3) Introduction to Materials Science
	M E 417 (3) Introduction to Polymer Processing
	M E 418 (3) Engineering Design with Polymers
	M E 508 (3) Composite Materials
	M E / CBE 525 (3) Macromolecular Hydrodynamics
	CBE 540 (3) Polymer Science and Technology
	CBE 541 (3) Plastics and High Polymer Laboratory

Area	Course
General	INTEREGR 160 (3) Intro to Engr. Design (for Freshman only)
	Up to 3 credits of BSE 001 Cooperative Education Program, BSE 299 Independent Study, BSE 399 Coordinated Internship, and/or BSE 699 Special Topics. No more than 2 credits of BSE 399 taken in a given semester can be used to meet technical elective requirements.
	Up to 6 credits of math, science, statistics or computer science courses that are designated “advanced”, or engineering courses with a 300 or greater course number
	E C E 376 (3) Electrical and Electronic Circuits
	M E / STAT 424 (3) Statistical Experimental Design for Engineers
	Physics 201 (5) General Physics
Biological Systems Engineering	BSE 351 (3) Structural Design for Agricultural Facilities
	BSE 356 (3) Sustainable Residential Construction
	BSE 367 (3) Renewable Energy Systems
	BSE 372 (2) On-Site Waste Water Treatment
	BSE 460 (3) Biorefining: Energy & Prod. from Renewable Res.
	BSE 472 (3) Sediment & Bio-Nutrient Engr. & Mgmt.
	BSE 473 (2) Irrigation and Drainage System Design
	BSE 475 (3) Engr Principles-of Ag Machinery
	BSE 476 (3) Engr Principles of Off-Road Vehicles
	BSE 571 (3) Small Watershed Engineering
	BSE 642 (2 or 3) Food and Pharmaceutical Separations
Mechanical Design	EMA 202 (3) or M E 240 (3) Dynamics
	EMA 303 (3), EMA 304 (3) or M E 306 (3) Mechanics of Materials
	EMA 405 (3) Practicum in Finite Elements
	M E 232 (3) Geometric Modeling for Engineering Applications

Continued on following page

2009-10 Course Requirements for BSE Degree – *Food and Bioprocess Engineering Technical Electives*

The following courses can be used to meet technical elective requirements for the Food and Bioprocess Engineering specialization

Area	Course
Mechanical Design	M E 307 (1) Mechanics of Materials Lab
	M E 340 (3) Introduction to Dynamic Systems
	M E 342 (3) Design of Machine Elements
	M E 350 (3) Advanced Graphic Analysis
	M E 361 (3) Thermodynamics
	M E 363 (3) Fluid Dynamics or CE 310 (3) but not both
	M E 443 (3) Design and Analysis of Rotating Machinery
	M E 444 (3) Design Problems in Elasticity
	M E 467 (3) Refrigeration
	M E 520 (3) Two-Phase Flow and Heat Transfer
	M E 563 (3) Intermediate Fluid Dynamics
	M E 573 (3) Computational Fluid Dynamics

Area	Course
Environmental	CEE 310 (3) Fluid Mechanics or M E 363 (3) but not both
	CEE 311 (3) Hydroscience
	CEE 315 (3) Hydrology
	CEE 320 (3) Environmental Engineering
	CEE 322 (3) Environmental Engineering Processes
	CEE 330 (4) Soil Mechanics
	CEE 423 (3) Air Pollution Effects, Measurement and Control
	CEE 426 (3) Design of Wastewater Treatment Plants
	CEE 428 (3) Water Treatment Plant Design
	CEE 500 (3) Water Chemistry

Four Year Road Map: Food and Bioprocess Engineering Specialization

This Road Map is a tool to assist you and your advisor in planning your academic career. Use it along with the Curriculum Sheet for your major, your DARS report, the appropriate checklist in the back of this document, and the Timetable. Your specific program of study could, and probably will, look different. You need to customize the Road Map to fit your situation, and consult with your advisor about the best path for you.

Year 1 – Fall Semester Course	Credits
Math 221 - Calculus and Analytic Geometry	5
Chemistry 109 - Advanced General Chemistry	5
Social Science (See I.E.4)	3
EPD 155 – Basic Communication (See I.C.)	2
	15

Year 1 – Spring Semester Courses	Credits
Biological Sciences (See I.F.)	3
Math 222 - Calculus and Analytic Geometry	5
EMA 201 - Statics	3
Economics Course	4
M E 231 – Introduction to Engineering Graphics	2
	17

Year 2 – Fall Semester Courses	Credits
Math 234 – Calculus -- Functions of Several Variables	3
Chemistry 341 – Introductory Organic Chemistry	3
Technical Elective (See VI.D)	5
Computer Science 310 - Problem Solving Using Computers	3
CBE 250 – Process Synthesis	3
	17

Year 2 – Spring Semester Courses	Credits
CBE 211– Thermodynamics of Mixtures	3
Ethnic Studies/International (See I.E.2 & I.H.)	3
Physics 202 General Physics	5
BSE 375 – Biological Concepts for Engineers	3
Statistics 224 – Introductory Statistics for Engineers	3
	17

Year 3– Fall Semester Courses	Credits
BSE 364– Engineering Properties of Food and Biological Materials	3
ISYE 313- Engineering Economics Analysis	3
CBE 320- Introductory Transport Phenomena	4
Bacteriology 325 – Food Bacteriology	3
Food Science 410-Food Chemistry 1	3
	16

Year 3 – Spring Semester Courses	Credits
Humanities (See I.E.3)	3
Biochemistry 501 - Introduction to Biochemistry	3
Food Science 432 – Principles of Food Preservation	3
CBE 326 – Momentum & Heat Transfer Operations	3
BSE 365 – Measurements and Inst. for Biological Systems	3
	15

Year 4– Fall Semester Courses	Credits
BSE 509 – Biological Systems Engineering Senior Design	3
BSE 409 - Career Management for Engineers	1
Breadth Requirement (See VI.D.)	3
Food Sci 532 – Integrated Food Manufacturing	4
EPD 397 - Technical Communications (See I.C.)	3
Technical Elective (See VI.D.)	3
	17

Year 4 – Spring Semester Courses	Credits
BSE 542 - Food Engineering Operations	4
BSE 441-Rheology	2
Humanities (See VI.D)	3
Technical Elective (see VI.D.)	3
Technical Elective (See VI.D.)	2
	14

Notes: Need 128 credits to complete degree. If Chemistry 103 & 104 is taken in place of Chemistry 109, it is suggested to take Chemistry 103 in Fall semester and Chemistry 104 in Spring semester of year 1.