

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	Area	Course
Biomedical, Bioengineering, Biomedical	B M E 310 (3) Bioinstrumentation	General	INTEREGR 160 (3) Intro to Engr. Design (for Freshman only)
	B M E 315 (3) Biomechanics		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.
	B M E 401 (3) Physics for Medicine and Biology		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
	B M E 430 (3) Biological Interactions with Materials		E C E 376 (3) Electrical and Electronic Circuits
	B M E 461 (3) Modeling of Physiological Systems		M E / STAT 424 (3) Statistical Experimental Design for Engineers
	B M E 505 (3) Biofluidics		Physics 201 (5) General Physics
	B M E 530 (3) Medical Imaging Systems		BSE 351 (3) Structural Design for Agricultural Facilities
	B M E 547 (3) Biomedical Optics		BSE 356 (3) Sustainable Residential Construction
	ECE 230 (4) Circuit Analysis		BSE 367 (3) Renewable Energy Systems
ECE 330 (3) Signals and Systems	BSE 372 (2) On-Site Waste Water Treatment		
Processing	CBE 311 (3) Thermodynamics of Mixtures	Biological Systems Engineering	BSE 460 (3) Biorefining: Energy & Prod. from Renewable Res.
	CBE 324 (2) Transport Phenomena Lab		BSE 472 (3) Sediment & Bio-Nutrient Engr. & Mgmt.
	CBE 426 (3) Mass Transfer Operations		BSE 473 (2) Irrigation and Drainage System Design
	CBE 430 (3) Chemical Kinetics and Reactor Design		BSE 475 (3) Engr Principles-of Ag Machinery
	CBE 560 (3) Biochemical Engineering		BSE 476 (3) Engr Principles of Off-Road Vehicles
	CBE 562 (3) Special Topics in Chemical Engineering		BSE 571 (3) Small Watershed Engineering
	CBE 565 (3) Food Process Engineering		BSE 642 (2 or 3) Food and Pharmaceutical Separations
	BSE 642 (2) Food and Pharmaceutical Separations		EMA 202 (3) or M E 240 (3) Dynamics
Rheology	M S E 271 (2) Materials Science and Engr. Problem Solving I	Mechanical Design	EMA 303 (3), EMA 304 (3) or M E 306 (3) Mechanics of Materials
	M S E 350 (3) Introduction to Materials Science		EMA 405 (3) Practicum in Finite Elements
	M E 417 (3) Introduction to Polymer Processing		M E 232 (3) Geometric Modeling for Engineering Applications
	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		

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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	
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 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 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
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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 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 – 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 – 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 – 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.