



**CHANDLER-GILBERT
COMMUNITY
COLLEGE**

480.732.7000
2626 East Pecos Road
Chandler, AZ 85225-2499

ENGINEERING PROGRAM
DIVISION OF SCIENCE

Bassam Matar
480-732-7139
B.Matar@cgcmail.maricopa.edu

Undergraduate Advisor
**ASU Department of
Bioengineering**

Margaret Acosta
480-965-3028
margaret.acosta@asu.edu

BIO ENGINEERING PROGRAM

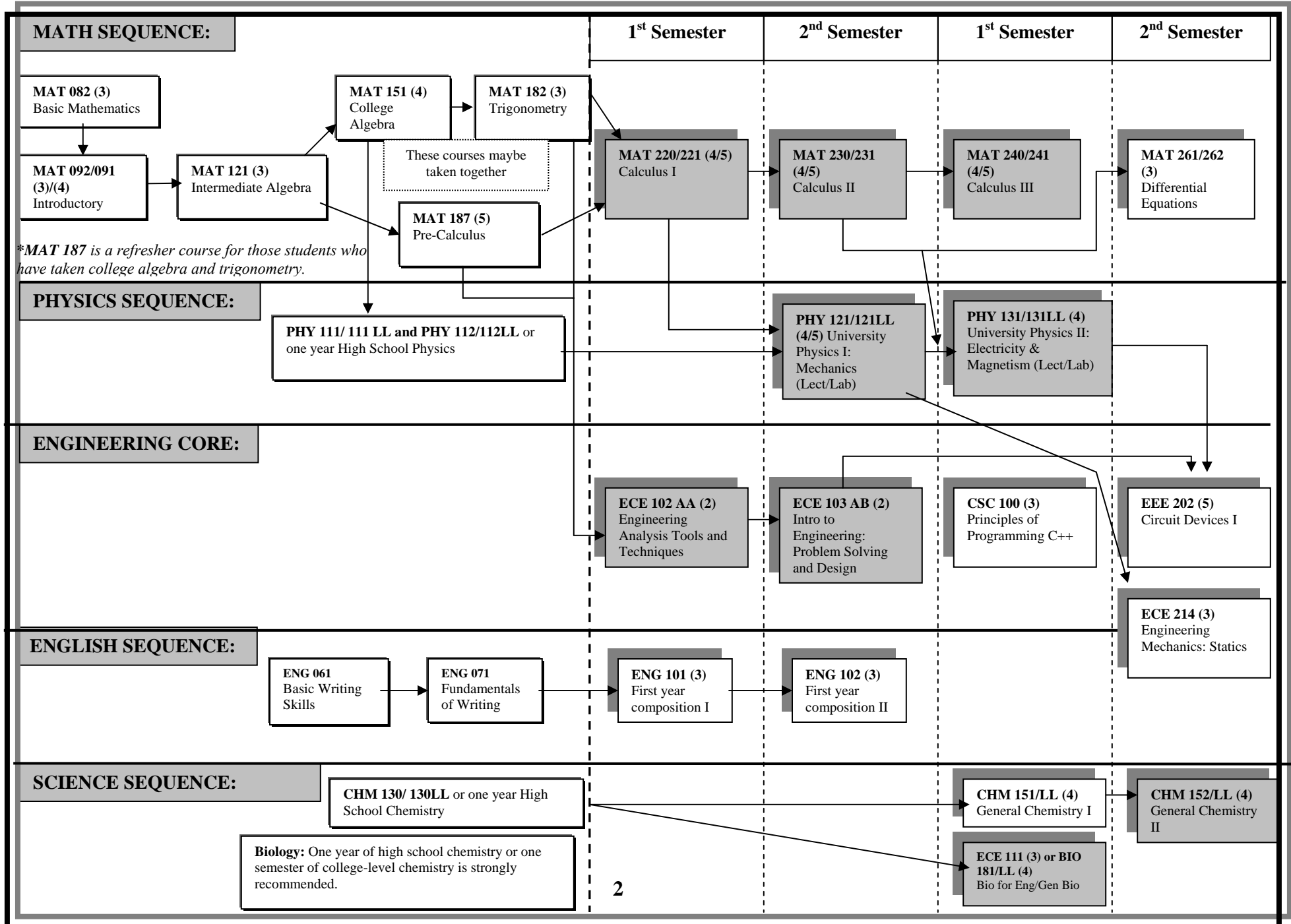
Advisement Packet

The content of this document might change.
Please check with an advisor.

ENGINEERING ASSESSMENTS AND COURSE SEQUENCE BIO ENGINEERING

Prerequisite Courses

Required Courses





ENGINEERING PROGRAM

SUGGESTED SEQUENCING OF COURSES

**Bio Engineering
Required Courses**

(Equivalent units at ASU are indicated between parentheses)

FRESHMAN YEAR				SOPHOMORE YEAR			
First Semester		Second Semester		First Semester		Second Semester	
Course	Cr	Course	Cr	Course	Cr	Course	Cr
ECE 102 AA	2	ECE 103 AB	2 (3)	ECE 111 or BIO 181+181LL	3/4 (3/4)	EEE 202	5 (4)
MAT 220/221	4/5 (4)	MAT 230/231	4/5 (4)	MAT 240/241	4/5 (4)	MAT 261/262	3/4(3)
ECN 111/112	3 (3)	PHY 121 & 121LL	4 (4)	PHY 131 & 131LL	4 (4)	CHM 152 & 152LL	4 (4)
ENG 101	3 (3)	ENG 102	3 (3)	CHM 151 & 151LL	4 (0)	HU/SB	3 (3)
		HU/SB	3 (3)	CSC 100	3 (3)	ECE 214	4 (4)
Total C.G.C.C. Credits:	12/13	Total C.G.C.C. Credits:	16/17	Total C.G.C.C. Credits:	18/20	Total C.G.C.C. Credits:	19/20
Total ASU Units:	(10)	Total ASU Units:	(17)	Total ASU Units:	(15)	Total ASU Units:	(18)
Total number of credit hours at CHANDLER-GILBERT COMMUNITY COLLEGE:							65/69
Total equivalent units at ARIZONA STATE UNIVERSITY:							(59)

Note: According to ASU Bio Engineering advisement sheet:

Humanities & Social Sciences (HU/SB) (15 hrs minimum)

(Required: 1 course upper division; 2 courses from the same dept; 2 depts. or more Represented; plus a minimum of two courses that satisfy three awareness areas: Cultural (C), Global (G), and Historical (H). Double counting is permissible between HU or SB and the awareness areas and also within the awareness areas.)

See attached sheet for available courses at CGCC.

The following courses meet the general studies requirements:

(Only lower division courses can be taken at Chandler-Gilbert Community College)

Awareness areas are coded:

(H) = **Historical** (G) = **Global** (C) = **Cultural**

HUMANITIES & FINE ARTS (HU):

AJS Administration of Justice	123
ARH Art Humanities	100/101(H)/102(H) 115/118(G)/145(C)/201(G, H)
ASB Anthropology	211(G)/221(G)/222(G, H)/223(G, H)
COM Communication	241
DAH Dance Humanities	100(G)/201(G)
EDU Education	291/292(C)/294(C)
ENH English Humanities	110(C)/112(C)/113/114(C)/201(H)/202(G,H)/204/205(C)/206/214/221(H)222(H)/230/241/ 242/250/251(G)/254/255(C)/256/259(C)/260(C)/270/275/284(C)/285(C)/289/291/ 294/295(C)
HUM Humanities	101/105AA-AE(C)*/107/108/120(C)/125/190AA-AI*/201(G)/202(G)/203/205/206/207/ 208(C)/ 209(C,H)/210/211AA-AC(G)/213(G)/214(C)/250(H)/251(H)/260(C)/ 261(G,H)/292(C)
MHL Music: History/Literature	140(H)/142(H)/143(G)/145(C)/146/147/153(H)
PHI Philosophy	101/102/103/104(G)/105/106/109/201/213/218/224/225(C)/233AA/233AB/234AA/ 243(G,H)/244/245/246
REL Religious Studies	101/201(H)/202(G)/203(C)/205/213/225(C)/243(G,H)/244/246/270/271
THE Theatre	111/205(H)/206/210/220/260

LITERACY & CRITICAL INQUIRY (L):

COM Communication	207/222/225/230/241
CRE Critical Reading	101
ENG English	111/200/213/215/216/217/218
ENH English Humanities	254/255(C)
GPH Physical Geography	211
HUM Humanities	250(H)/251(H)
JRN Journalism	201/212
MCO Mass Communications	220(C)
PHI Philosophy	103/106
POS Political Science	115
PSY Psychology	290AB-AC
REL Religion	203(C)/205
THE Theatre	220
THP Theatre Performance/Prod.	241

SOCIAL & BEHAVIORAL SCIENCES (SB):

AJS Administration of Justice	101/200/225/258(C)/270(C)
ASB Anthropology	102(G)/211(G)/214(G)/222(G,H)/223(G,H)/230/235(C,H)/238(H)/245(C,H)
CFS Child/Family Studies	157/159/176/205/259
COM Communication	100/110/230/250/263(C,G)
ECN Economics	111/112/160(H)/212(G)/250(G)
EDU Education	221/222(C)
GBS General Business	280
HES Health Science	100
HIS History	100(H)/101(H)/102(G,H)/103(H)/104(H)/105(H)/105AA-AC(H)/106(C,H)/109(C,H)/ 135(H)/145(G,H)/170(C,H)173(H)/201(C,H)/203(C,H)/209(C,H)/241(H)/242(G,H)/ 251(H)/252(H)/272(G,H)/273(G,H)/277(G,H)
POS Political Science	100/110/115/120(G)/125(G)/130/140(G)/210/223(C)/285
PSY Psychology	101/132(C,G)/157(C,G)/215/218/235©/240/245/250/258/260/266/270/277/280/281/292
SOC Sociology	101/110/130/140(C)/141(C,H)/143(C)/157/210/212(C)/215/240(C)/245/251/253/265/270

EQUIVALENCY INFORMATION for BIOENGINEERING

For transfer from CGCC to ASU

<i>CHANDLER-GILBERT COMMUNITY COLLEGE</i>			<i>Arizona State University</i>	
<i>Course</i>	<i>Cr</i>	<i>Title</i>	<i>Course</i>	<i>Cr</i>
ECE 111	3	Biology for Engineers	BME 111	3
BIO 181 & 181LL	4	General Biology I & Lab	BIO 188	4
CHM 151	3	General Chemistry I	CHM 113	3
CHM 151LL	1	General Chemistry I Lab	CHM 113	1
CHM 152	3	General Chemistry II	CHM 114 or 116	3
CHM 152LL	1	General Chemistry II Lab	CHM 114 or 116	1
CHM 235	3	General Organic Chemistry I	CHM 331	3
CHM 235LL	1	General Organic Chemistry I Lab	CHM 335	1
CSC 100	3	Principles of Programming C++	CSE 100	3
ECE102AA & 103AB	2,2=4	Intro to Engineering	BME 100	3
EEE 202	5	Circuit Devices I	EEE 202	4
ECE 214	4	Engineering Mechanics	MAE 212	4
MAT 220/221	4/5	Calculus I	MAT 265	3
MAT 230/231	4/5	Calculus II	MAT 266	3
MAT 240/241	4/5	Calculus III	MAT 267	3
MAT 261/262	3/4	Differential Equations	MAT 275	3
PHY 121 & 121LL	4	Physics I & Lab	PHY 121 & 122	
PHY 131 & 131LL	4	Physics II & Lab	PHY 131 & 132	4
				4
ENG 101	3	First Year Comp. (ENGLISH)	ENG101	
ENG 102	3	First Year Comp. (ENGLISH)	ENG102	3
				3



**CHANDLER-GILBERT
COMMUNITY
COLLEGE**



480.732.7000
2626 East Pecos Road
Chandler, AZ 85225-2499

**BIO
ENGINEERING PROGRAM**

PERSONAL ENGINEERING SCHEDULE

FRESHMAN YEAR				SOPHOMORE YEAR			
First Semester		Second Semester		First Semester		Second Semester	
Course	Cr	Course	Cr	Course	Cr	Course	Cr
Total C.G.C.C. Credits:		Total C.G.C.C. Credits:		Total C.G.C.C. Credits:		Total C.G.C.C. Credits:	
Total ASU Units:	()	Total ASU Units:	()	Total ASU Units:	()	Total ASU Units:	()
Total number of credit hours at CHANDLER-GILBERT COMMUNITY COLLEGE:							
Total equivalent units at ARIZONA STATE UNIVERSITY:							()

Bioengineering Skill Set

Course	Credits	Course Name	Course Description
ECE 102AA	2	Engineering Analysis Tools and Techniques	Learning culture of engineering, engineering use of computer tools, and computer modeling as applied to engineering analysis and design. Prerequisites: Two years of high school algebra or MAT122 or departmental approval. Corequisites: MAT151 or MAT182 or MAT187.
ECE 103AB	2	Engineering Problem Solving and Design	Fundamentals of the design process: engineering modeling, communication and problem-solving skills in a team. Emphasis on process-based improvements to the design process. Introduction to engineering as a profession. Prerequisites: ECE102 and (high school physics or PHY111).
ECE 111	3	Biology for Engineers (LEC)	N/A
OR BIO 181 & 181LL	4	General Biology I (L+L)	Principles of structure and function of living things at molecular, cellular, and organismic levels of organization. Field trips may be required at students' expense. Prerequisites: None.
BME 200	3	Conserv. Principles in Biology	N/A
CHM 152+152LL	4	General Chemistry II (L+L)	A study of the chemical properties of the major groups of elements, equilibrium theory, thermodynamics, electrochemistry, and other selected topics. Completion of CHM152LL required to meet the Natural Science requirement. Prerequisites: CHM151 and CHM151LL.
MAT 220/221	4/5	Calculus with Analytic Geometry I (LEC)	Real numbers, limits, continuity, differential and integral calculus of functions of one variable. May receive credit for only one of the following: MAT220 or MAT221. Prerequisites: Grade of "C" or better in (MAT150 or MAT151 or MAT152) and (MAT182 or MAT187 or equivalent), or satisfactory score on district placement exam.
MAT 230/231	4/5	Calculus with Analytic Geometry II (LEC)	Methods of integration, applications of calculus, elements of analytic geometry, improper integrals, sequences and series. May receive credit for only one of the following: MAT230 or MAT231. Prerequisites: Grade of "C" or better in MAT220, or MAT221, or equivalent.
MAT 240/241	4/5	Calculus with Analytic Geometry III (LEC)	Vector-valued functions of several variables, multiple integration, introduction to vector analysis. Prerequisites: Grade of "C" or better in MAT230 or MAT231.
PHY 121+121LL	4	University Physics I: Mechanics (L+L)	Kinematics, Newton's laws, work, energy, momentum, conservation laws, dynamics of particles, solids, fluids, mechanical waves, and sound. Prerequisites: MAT220, or MAT221, or department consent. One year of High School physics or PHY111 and PHY112 suggested but not required.
PHY 131+131LL	4	University Physics II: Electricity and Magnetism (L+L)	Electric charge and current, electric and magnetic fields in vacuum and in materials, and induction. AC circuits, displacement current, and electromagnetic waves. Prerequisites: MAT230, or MAT231, or department consent, and PHY121. Corequisites: MAT241 or department consent.
<i>TOTAL CREDITS</i>	<i>34/38</i>		

Minimum GPA may vary from semester to semester. See ASU's Bioengineering department/website for more details (<http://fulton.asu.edu/~bme/students/undergraduate/major.php>).

Name _____

Major: Bioengineering

Degree BSE

ASU ID _____

Anticipated Grad. Date _____

AGEC-A, AGECE-B, AGECE-S; Completed: Yes No

ASU Requirement for all incoming Freshmen				
ASU 101 The ASU Experience	1 credit			
I. English Proficiency (6 hrs) <i>(University requirement – "C" min required)</i>	Hrs Cr ASU Tr	Trans From	Gr	
+ENG 101 / 107 First-Year Comp (3) ENG 101 and +ENG 102 / 108 First-Year Comp (3) ENG 102 Or , if eligible (see Catalog for eligibility), +ENG 105 Adv First-Year Comp (3) and An Applicable Elective (3) – see Department				
Sub Total (I) _____				

II. General Requirements (15 hrs) <i>(See Catalog for approved courses)</i>				
A. Humanities & Social Sciences (15 hrs min) <i>(Required: 1 course upper division; plus a minimum of two courses that satisfy three awareness areas: cultural (C), global (G), and historical (H). Double counting is permissible between HU or SB and the awareness areas and also within the awareness areas.)</i>				
Humanities, Fine Arts and Design (6 hrs min)(HU)				
Social/Behavioral Sciences (6 hrs min)(SB)				
Awareness Areas:				
Cultural				
Global				
Historical				
B. Literacy/Critical Inquiry (6 hrs)				
+#L: BME 413 Bio Instrumentation ¹ and +#L: BME 423 Bio Inst Lab ¹	Satisfied by Courses in Major			
+#L: BME 417 Biomed Eng Cap Design I				
C. Natural Sciences (8 hrs)				
SQ: PHY 121/122 Physics I + Lab I	Satisfied by Courses in Major			
SQ: PHY 131/132 Physics II + Lab II				
D. Mathematical Studies (6 hrs)				
CS: CSE 100 Prin of Prog C++	Satisfied by Courses in Major			
MA: MAT 275 Mod Diff. Equ.				
Sub Total (II) _____				

III. Required Lower Division Courses (53 hrs)				
A. Natural Sciences/Basic Sciences (20 hrs)				
+BME 111 Engr Persp on Bio Sys (3) and +BME 112 Engr Persp Lab (1) OR BIO 188 General Biology II (SQ) (4) BIO 181+181LL	4			
CHM 114 or 116 Gen Chem (SQ) ² CHM 151 + 151LL, CHM 152 + 152LL	4			
CHM 231/233 Elem/Gen Organ Chem CHM 235	3			
CHM 235/237 Elem/Gen Organ Chem Lab CHM 235LL	1			
PHY 121 Physics I (SQ) ³ PHY 115	3			
PHY 122 Physics Lab I (SQ) ³ PHY 115LL	1			
PHY 131 Physics II (SQ) ³ PHY 116	3			

PHY 132 Physics Lab II (SQ) ³ PHY 116LL				
B. Mathematical Studies (12 hrs)	Hrs Cr ASU Tr	Trans From	Gr	
MAT 265 Calc for Engrs I MAT 220	3			
MAT 266 Calc for Engrs II MAT 230	3			
MAT 267 Calc for Engrs III MAT 240	3			
MAT 275 Mod Diff Eq (MA) MAT 261	3			
C. Lower Division Engrg (21 hrs)				
+BME 100 Intro to Bioengineering (CS) ECE 102+103	3			
+BME 200 Conserv Princip in Bio	3			
+BME 235 Physiology for Engineers	4			
CSE 100 Principles of Prog C++ (CS) CSC 100	3			
EEE 202 Circuits I EEE 202	4			
MAE 212 Engineering Mechanics ECE 214	4			
Sub Total (III) _____				

# IV. Required Upper Division Courses (46 hrs)				
+BME 300 Bioengineering Prod Design	3			
+BME 318 Biomaterials	4			
+BME 331 BME Transport Phenom	3			
+BME 350 Signals & Sys for Bio	3			
+BME 370 Microcomputer Apps in Bio	3			
+BME 413 Bio Instrumentation (L) ¹	3			
+BME 417 Biomed Eng Cap Design I (L)	4			
+BME 423 Bio Instrumen Lab (L) ¹	1			
+BME 434 Applications in Bio OR	3			
+BME 416 Biomechanics OR				
+BME 419 Biocontrol Systems				
+BME 490 Biomed Eng Cap Design II	4			
CHM 341 EI Physical Chemistry	3			
IEE 380 Prob and Stats for Eng	3			
MAT 343 Applied Linear Algebra	3			
+Technical Electives (6 hrs)				
Sub Total (IV) _____				

Total Upper Division _____ *(minimum 45 required)*
 + A minimum grade of "C" (2.0) required
 # Designates upper division course in the Major: A minimum cumulative GPA of 2.00 required
 Designates a skill-set course
¹ Must complete both BME 413 & 423 to receive L credit
² CHM 113 is prerequisite and does not apply toward degree credit
³ Must complete lecture and lab to receive SQ credit.

Graduation Requirements: Regular Curriculum – 120 Hours

Semester Hour Summary	Hrs/ASU	Tr Hrs	Total
I. English Proficiency			
II. General Requirements			
III. Required Lower Division			
IV. Required Upper Division			
Total Program Hours			

