

## B.S. Bioengineering Curriculum Biomedical Engineering (BME) Concentration

### Freshman Year

First Semester			Lec	Lab	C	Second Semester			Lec	Lab	C
ENL	101	Critical Writing & Reading I	3	0	3	ENL	102	Critical Writing & Reading I	3	0	3
CHM	153	Principles Modern Chem. I	3	0	3	CHM	152	Principles Modern Chem. II	3	0	3
BNG	101	Intro. to Bioengineering	3	0	3	CHM	162	Intro. to Applied Chem. II	1	2	1
MTH	153	Calc for Appl Sci & Eng I	4	0	4	MTH	154	Calc for Appl Sci & Eng II	4	0	4
EGR	111	Intro Engineering & Comput.	2	3	3	PHY	111	Physics for Appl Sci & Eng I	4	2	4
					<b>16</b>						<b>15</b>

### Sophomore Year

First Semester			Lec	Lab	C	Second Semester			Lec	Lab	C
EGR	241	Engin. Mechanics: Statics	3	0	3	BNG	232	Funda. Engi. Bio. Lab		3	1
ENL	266	Technical Communication	3	0	3	BNG	255	Biology for Engineers	3	0	3
MTH	213	Calc for Appl Sci & Eng III	4	0	4	MTH	212	Differential Equations	3	0	3
PHY	112	Physics for Appl Sci & Eng II	4	2	4	MNE	220	Engin. Thermodynamics I	3	0	3
		University Studies 3A	3	0	3	ECE	201	Circuit Theory I	3	1.5	3.5
					<b>17</b>						<b>13.5</b>

### Junior Year

First Semester			Lec	Lab	C	Second Semester			Lec	Lab	C
BNG	311	Statistics for Bioengineer	3	0	3	BNG	312	Biotransport	3	0	3
BNG	318	Biomeasurement & Control	3	0	3	BNG	315	Biomechanics	3	0	3
BNG	319	Chem Methods in Bioengin.	3	0	3	BNG	316	Biomaterials	3	0	3
BNG	320	Biomeasurement Laboratory	0	3	1	BNG	317	Biomechanics Laboratory	0	3	1
BNG	321	Quant. Physiology	3	0	3			University Studies 4A	3	0	3
BNG	322	Quant. Physiology Lab	0	3	1						
		University Studies 3B	3	0	3						
					<b>17</b>						<b>13</b>

### Senior Year

First Semester			Lec	Lab	C	Second Semester			Lec	Lab	C
EGR	497	Bioeng. Capstone Design I	1	2	2	EGR	498	Bioeng. Capstone Design II	1	2	2
BNG	411	Bioengineering Lab	2	3	3	BNG	423	Biosystems Analysis & Dsgn.	3	1.5	3.5
BNG		Specialization	3	0	3	BNG	428	Med Device Reg. & Strat.	3	0	3
BNG		Specialization	3	0	3	BNG		Specialization	3	0	3
		University Studies 4B	3	0	3	BMB	571	Ethic. Issue in Biomed. Res.	1	0	1
								University Studies 4C	3	0	3
					<b>14</b>						<b>15.5</b>

**Total Credits 121**

Lec = Lecture (hours)      Lab = Lab (hours)      C = Number of Credits

Admission to the Biomedical Engineering (BME) Concentration requires a B- or better in EGR 241 (Statics) and CHM 152 (Principles of Modern Chemistry II). Qualified students should apply no later than the end of the sophomore spring semester.

The concentration consists of a set of eight Biomedical Engineering Foundation Core courses (List A), one Biomedical Engineering Core course (List B), and two electives chosen from an approved list of Cell and Tissue Engineering (List C) or Medical Devices and Manufacturing (List D). Students in the BME concentration will also choose a related senior design project. In order to graduate with the concentration, students must have a 2.000 bioengineering major GPA and a 2.500 BME GPA.

List A: BME Foundation Core: All courses required.

Course	Title
BNG 255 & BNG 232	Biology for Engineers & Fundamental Engineering Biology Lab
BNG 318 & BNG 320	Biomeasurement and Control & Lab
BNG 321 & BNG 322	Quantitative Physiology & Lab
BNG 428	Medical Device Regulations and Regulatory Strategies
BMB 571	Ethical issues in Biomedical Research

List B: Biomedical Engineering Core<sup>1,2</sup>: Choose 1 course.

Course	Title
BNG 415	Implantable Sutures and Structures
BNG 416	Biomedical Devices
BNG 421	Cell and Tissue Engineering

Themed Lists: Choose 2 courses<sup>1,2</sup> from either List C or List D. Choose both courses from the same list.

List C: Cell and Tissue Engineering

Course	Title
BNG 412	Molecular Bioengineering
BNG 417	Nanotechnology in Bioengineering Systems
BNG 418	Biological Interactions on Material Surfaces
BNG 420	Case Studies in Bioengineering
BNG 421	Cell and Tissue Engineering
BNG 424	Human Organogenesis
BIO 422	Immunology

List D: Medical Devices and Manufacturing

Course	Title
BNG 415	Implantable Sutures and Sensors
BNG 416	Biomedical Devices
BNG 418	Biological Interactions on Material Surfaces
ECE 403	Special Topics in Electrical Engineering – Medical Ultrasonics
MNE 476	Manufacturing and Quality Control
MNE 482	Robotics

<sup>1</sup> Courses in List B that appear in List C or List D do not double count.

<sup>2</sup> Taken as a Specialization course.