UMass Dartmouth
COLLEGE OF ENGINEERING

Catalog Year 2019-20 to present
Class of 2023 and beyond

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

Freshman Year

First Semester			Lec	Lab	C	Second Semester			Lec	Lab	C
BNG	101	Intro. to Bioengineering	3	0	3	CHM	152	Principles Modern Chem. II	3	0	3
CHM	151[1]	Principles Modern Chem. I	3	0	3	ENL	102	Critical Writing & Reading I	3	0	3
CHM	161	Intro. to Applied Chem. II	1	2	1	MTH	154	Calc for Appl Sci & Eng II	4	0	4
EGR	111	Intro Engineering & Comput.	2	3	3	PHY	113[1]	Classical Physics I	4	2	4
ENL	101	Critical Writing & Reading I	3	0	3						
MTH	153	Calc for Appl Sci & Eng I	4	0	4						
					17						**14**

Sophomore Year

First Semester			Lec	Lab	C	Second Semester			Lec	Lab	C
BNG	219	Chem Methods in Bioengin.	3	0	3	BNG	220	Biochem Thermodynamics	3	0	3
EGR	241	Engin. Mechanics: Statics	3	0	3	BNG	232	Funda. Engi. Bio. Lab	0	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	ECE	201	Circuit Theory I	3	1.5	3.5
PHY	114[1]	Classical Physics II	4	2	4	MTH	212	Differential Equations	3	0	3
					17						**13.5**

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	320	Biomeasurement Laboratory	0	3	1	BNG	316	Biomaterials	3	0	3
BNG	321	Quant. Physiology	3	0	3	BNG	317	Biomechanics Laboratory	0	3	1
BNG	322	Quant. Physiology Lab	0	3	1			University Studies 4A	3	0	3
		University Studies 3A	3	0	3						
		University Studies 3B	3	0	3						
					17						**13**

Senior Year

First Semester			Lec	Lab	C	Second Semester			Lec	Lab	C
BNG	497	Bioeng. Capstone Design I	1	2	2	BNG	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	428	Med Device Reg. & Strat.	3	0	3	BNG		Specialization	3	0	3
BNG	451	Ethics for Biomedical Eng.	1	0	1	BNG		Specialization	3	0	3
BNG		Specialization	3	0	3			University Studies 4C	3	0	3
		University Studies 4B	3	0	3						
					15						**14.5**

Total Credits 121

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

The Biomedical Engineering (BME) Concentration is offered to students who wish to expand their education on medical applications of bioengineering. In order to graduate with the concentration, students must have a 2.000 BNG major GPA and a 2.700 BME GPA as well as completion of the other required courses in the curriculum.

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.

[1] CHM 153, PHY 112, and PHY 114 may be taken in place of CHM 151, PHY 111, and PHY 112, respectively.

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
BNG 451[2]	Ethics for Biomedical Engineers

List B: Biomedical Engineering Core[3,4]: 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[3,4] from either List C or List D. Choose both courses from the same list.
List C: Cell and Tissue Engineering

Course	Title
BNG 400[5]	Special Topics in Bioengineering
BNG 412	Molecular Bioengineering
BNG 416	Biomedical Devices
BNG 417	Nanotechnology in Bioengineering Systems
BNG 418	Biological Interactions on Material Surfaces
BNG 419	Biomimetics
BNG 420	Case Studies in Bioengineering
BNG 421	Cell and Tissue Engineering
BNG 424	Human Organogenesis
BNG 425	Mechanobiology
BNG 426	Metabolic Engineering
BNG 430	Synthetic Biology
EGR 490[6]	Engineering Internship

List D: Medical Devices and Manufacturing

Course	Title
BNG 400[5]	Special Topics in Bioengineering
BNG 415	Implantable Sutures and Sensors
BNG 416	Biomedical Devices
BNG 417	Nanotechnology in Bioengineering Systems
BNG 418	Biological Interactions on Material Surfaces
BNG 419	Biomimetics
ECE 403	Special Topics in Electrical Engineering – Medical Ultrasonics
EGR 490[6]	Engineering Internship
MNE 476	Manufacturing and Quality Control
MNE 482	Robotics

[2] BMB 571 may be taken in place of BNG 451.
[3] Courses in List B that appear in List C or List D do not double count.
[4] Taken as a Specialization course.
[5] Use of BNG 400 requires approval from the BME Coordinator.
[6] Up to 3 credits may be applied and requires approval from the BME Coordinator