UCDAVIS
BIOLOGICAL AND AGRICULTURAL ENGINEERING

Biological Systems Engineering (EBSE) B.S. Degree Requirements, 2023-2024

This program is accredited by the Engineering Accreditation Commission of **ABET**, http://www.abet.org

Undergrad Advising: BAEadvising@ucdavis.edu. **To make an advising appointment**: http://www.appointments.ucdavis.edu

***Note**: Curriculum and courses offerings are subject to change. You must fulfil the degree requirements stated in the catalog of the year you graduate or the year immediately prior. For additional detail on courses and requirements, please visit the course supplement located in the UC Davis Catalog.*

General Education Requirement

This requirement is partially satisfied with coursework completed for the Biological Systems Engineering degree. A detailed GE checklist can be found here.

Biological Systems Engineering — Lower Division Requirements

	Units	Course	Course Title	Prerequisites: *C- or better required, MTC = May Take Concurrently	Quarters Offered			Suggested Quarter
ENGLISH COMPOSITION - Select ONE of the following courses:								
☐	4	UWP 1/Y/V	Expository Writing	ELWR Satisfied	F	W	S	1
☐	4	ENL 3	Introduction to Literature	ELWR Satisfied	F	W	S	1
☐	4	COM 1	Bks of West Civ/Ancient World	ELWR Satisfied	F	W	S	1
☐	4	COM 2	Bks of West Civ/ Mid-Age Engl	ELWR Satisfied	F	W	S	1
☐	4	COM 3	Bks of West Civ/Modern Crisis	ELWR Satisfied	F	W	S	1
☐	4	COM 4	Bks of Contemporary World	ELWR Satisfied	F	W	S	1
☐	4	NAS 5	Intro to Native American Lit	ELWR Satisfied	F	W	S	1
MATHEMATICS								
☐	4	MAT 21A	Calculus	Math Placement Exam Score: Total: 35+, Trig: 3+	F	W	S	1
☐	4	MAT 21B	Calculus	MAT 21A	F	W	S	2
☐	4	MAT 21C	Calculus	MAT 21B	F	W	S	3
☐	4	MAT 21D	Vector Analysis	MAT 21C	F	W	S	4
☐	3	MAT 22A	Linear Algebra	MAT 21C, ENG 6 (MTC)	F	W	S	5
☐	3	MAT 22B	Differential Equations	MAT 22A	F	W	S	6
GENERAL CHEMISTRY								
☐	5	CHE 2A	General Chemistry	Chemistry Placement Exam Score: 24+	F	W		2
☐	5	CHE 2B	General Chemistry	CHE 2A		W	S	3
PHYSICS								
☐	5	PHY 9A	Classical Physics	MAT 21B	F		S	3
☐	5	PHY 9B	Classical Physics	MAT 21C, MAT 21D (MTC), PHY 9A	F	W		4
☐	5	PHY 9C	Classical Physics	MAT 21D, MAT 22A (MTC), PHY 9B		W	S	5
BIOLOGICAL SCIENCES								
☐	5	BIS 2A	Essentials of Life	*CHE 2A (recommended)*	F	W	S	4
ENGINEERING SCIENCE								
☐	4	EBS 1	Foundations of Bio. Sys. Engr.	Restricted to BSE Majors	F			1
☐	4	*ENG 6* **OR**	Application of Computers	MAT 21A*, MAT 21B* (MTC)	F	W	S	2
		ECS 32A			F	W	S	2
☐	4	ENG 35	Statics	PHY 9A*, MAT 21D* (MTC)	F	W	S	4
☐	4	EBS 75	Prop. of Matls. in Bio. Sys.	BIS 2A, PHY 9B (MTC)		W		5
☐	4	ENG 17	Circuits	MAT 21C	F	W	S	6
ORAL COMMUNICATION - Select ONE of the following courses:								
☐	4	*CMN 1* **OR**	Intro. to Public Speaking	ELWR Satisfied	F	W	S	6
		ENG 3	Interpersonal Com. Competence	ELWR Satisfied	F	W	S	6
ORGANIC CHEMISTRY								
☐	2	CHE 8A	Organic Chemistry	CHE 2B*	F		S	7
☐	4	CHE 8B	Organic Chemistry	CHE 8A/118A	F	W		8

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Biological Systems Engineering — Upper Division Requirements

	Units	Course	Course Title	Prerequisites: *C- or better required, MTC = May Take Concurrently	Quarters Offered			Suggested Quarter
STATISTICS								
☐	4	STA 100	Applied Stats for Biol Scientists	MAT 21B*	F	W	S	7
ENGINEERING TOPICS								
☐	3	ENG 100	Electronic Circuits & Systems	ENG 17	F	W	S	8
☐	4	ENG 102	Dynamics	MAT 22B*, ENG 35*	F	W	S	7
☐	4	ENG 103	Fluid Mechanics Fundamentals	MAT 22B*, ENG 35*, PHY 9B*	F	W	S	8
☐	4	ENG 104	Mechanics of Materials	MAT 22B*, ENG 35*	F	W	S	9
☐	4	ENG 105	Thermodynamics	MAT 22B*, PHY 9B*	F	W	S	7
☐	4	ENG 106	Engineering Economics			W		11
☐	4	EBS 125	Heat & Mass Transfer in Bio. Sys.	EBS 75, BIS 2A, ENG 103, ENG 105			S	9
☐	4	EBS 127	Mass Transfer & Kinetics	EBS 125	F			10
☐	4	EBS 130	Dyn Model of Proc in Bio Sys	MAT 22B*, ENG 6, EBS 75		W		8
☐	4	EBS 165	Bioinstrumentation and Control	ENG 100	F			10
☐	3	EBS 170A	Engr Design & Prof. Respon.	EBS 1, ENG 102, ENG 104	F			10
☐	2 1	EBS 170 B & EBS 17BL	Engr Projects: Design	EBS 170A; concurrent enrollment in EBS 170BL		W		11
☐	2 1	EBS 170 C EBS 170 CL	Engr Projects: Design Eval.	EBS 170B; concurrent enrollment in EBS 170CL			S	12

BIOLOGICAL SYSTEMS ENGINEERING ELECTIVE (EBS) – Minimum of 4 units

☐ Select any upper division EBS courses not otherwise required for the major, **EXCEPT** EBS 189-199.

ENGINEERING ELECTIVES – Minimum of 8 units

☐ Select three units from any upper division courses within the College of Engineering **EXCEPT** ECI 123, 188; ENG 160; courses numbered 190-197, 199 (ENG 190 may only be taken for 2 units of engineering elective credit).

Acceptable subject codes: ENG, EBS, BIM, ECH, EMS, ECI, ECS, EEC, EME, EAE

College of Engineering Elective Course Tips:

BIM-Biomedical Engineering – Most require BIS 2A or BIS 2B
EAE-Aerospace Science & Engineering – Most courses require upper-division ENG courses
ECH-Chemical Engineering – Most non-required ECH courses will have their pre-reqs already satisfied
ECI-Civil & Environmental Engineering – Most upper-division courses require ENG 35
ECS-Computer Science Engineering – Most require a programming course/series &/or ENG 17
EEC-Electrical & Computer Engineering – Most upper-division courses require ENG 17
EME-Mechanical Engineering – Most upper-division courses require upper-division ENG courses.
EMS-Materials Science & Engineering – most upper-division courses require ENG 45
ENG-Engineering– Most upper-division courses require ENG 35

BIOLOGICAL SCIENCE ELECTIVES – Minimum of 9 units

☐ Select three units from any upper division course with the College of Biological Sciences **EXCEPT** BIS 132; EVE 175; EXB 102, 112, 115, 120, 121, 124, 125, 148; and all courses number 190-199.

The following courses may also be taken as biological sciences electives: BIS 2B, BIS 2C; ABT 161; ANS 118, 143, 144, 146; ATM 133; AVS 100; BIS 2B, 2C; CHA 101, 101L; ENT 100; ENH 102; ESM 120; ESP 100, 110, 155; ETX 101, 131; FST 102A, 104L, 119, 128, 159; IDI 141; SSC 100; WFC 121.

Acceptable subject codes: BIS, MCB, EVE, EXB, MIC, NPB, PLB

Students may choose other upper division courses with substantial biological content offered by the College of Agricultural and Environmental Sciences; email BAEAdvising@ucdavis.edu with a syllabus and short explanation about why the course should be considered for biological science elective credit for approval before registering.

Upper Division English Composition (must pass course with C- or higher) – Select one (1) of the following courses:								
☐	4	UWP 101	Advanced Composition	UWP 1; Upper Division Standing	F	W	S	8-10
☐	4	UWP 102E	Writing in Engineering	UWP 1; Upper Division Standing	F	W	S	8-10
☐	4	UWP 104A	Business Reports & Technical Communications	UWP 1; Upper Division Standing	F	W	S	8-10
☐	4	UWP 104T	Technical Writing	UWP 1; Upper Division Standing	F	W	S	8-10
☐	4	UWP 104E	Writing in the Professions: Science	UWP 1; Upper Division Standing	F	W	S	8-10
☐	4	UWP 104F	Writing in the Health Profession	UWP 1; Upper Division Standing	F	W	S	8-10