

BIOLOGICAL SYSTEMS ENGINEERING ~ UPPER DIVISION REQUIREMENTS

	Qtr Taken	Qtr	Title (L) = Lab Courses	Prerequisites	(COI=Consent of instructor) (MTC=May take concurrently)
FOOD ENGINEERING COURSES - Take all of the following courses in place of BIS 1B and BIS 1C for Food Engr.					
_____	4/	FST 100A	10 I	Food Chemistry (D)	CHE 8B, BIS 1A recommended
_____	3/	FST 104	8 II	Food Microbiology	BIS 1A, BIS 102
_____	4/	FST 131	10 I,	Food Packaging (D)	Chem 8B, BIS 1A, PHY 7C
_____	3/	BIS 102	7 I, II, III	Structure and Function of Biomolecules	CHE 8B, or 118B, or 128B

MATH/STATISTICS AND BASIC SCIENCES

_____	4/	STA 100	7 I, II, III	Applied Statistics for Biological Scientists	MATH 16B or equivalent
_____	4(4)/CHE 8B/118B*	(OR)	7 I,II/II,III	Organic Chem / O Chem for Life Sci. (All labs)	CHE 8A / CHE 118A
_____	4/*	ECl 10**	12 III	Intro. to Surveying (L)	None. (*Only 3 units of credit if you have taken EBS 1.)

ENGINEERING TOPICS

_____	3/	ENG 100	8 II, III	Electronic Circuits & Systems (L)	ENG 17
_____	4/	ENG 102	7 I, II, III	Dynamics	ENG 35 and MATH 22B
_____	4/	ENG 104† (or)	9 I, II, III	Mechanics of Materials	ENG 35 and MATH 22B
_____	3/	ECH 161A††	11 II	Biochemical Engr. Fundamentals	CHEM 128A, MATH 22B & MIC 102 (or (COI)
_____	4/	ENG 105	7 I, II, III	Thermodynamics	MATH 21D and 22B and PHYSICS 9B
_____	3/	ENG 106	11 II	Engineering Economics	Upper division standing
_____	4/	EBS 103	8 II	Fluid Mechanics Fundamentals	Physics 9B
_____	4/	EBS 125	9 III	Heat & Mass Transfer in Biological Sys. (L)	EBS 75, 103 and ENG 105
_____	4/	EBS 130	8 II	Dyn Model of Proc in Bio Sys (D)	EBS 75; ENG 6 or ECS 30; MAT 22B (Matlab)
_____	4/	EBS 165	10 I	Bioinstrumentation and Control (L)	ENG 100 and ENG 6 or ECS 30
_____	3 /	EBS 170A	10 I	Engr Design & Prof. Respon. (L)	ENG 102 and 104
_____	2,1/	EBS 170B, BL	11 II	Engr Projects: Design (L)	EBS 170A; concurrent enrollment in EBS 170BL
_____	1,2/	EBS 170C, CL	12 III	Engr Projects: Design Eval. (L)	EBS 170B, BL; concurrent enrollment in EBS 170CL

BIOLOGICAL SYSTEMS ENGINEERING ELECTIVE (EBS): Select one course from all upper division EBS courses not otherwise required with the exception of EBS 189-199. 3-4 units required. See listing of EBS courses in General Catalog or Engineering Bulletin.

Engineering and Biological Science Electives enable students to specialize in different areas within the major. *Specialization areas are:*

**† Agricultural Engineering	**† Biotechnical Engineering	**† Forest Engineering	**† Ecological Systems Engineering
*† Aquacultural Engineering	*† Biomechanics/Pre-Medicine/Pre-Veterinary Medicine	*† Food Engineering	

Students are not required to specialize. They may choose to develop their own specialization in consultation with their adviser, based on their area of interest.

ENGINEERING ELECTIVES - Select a minimum of 3 units.

All upper division courses offered by the College of Engineering may be taken as engineering electives with the exception of the following: ECS 188, ENG 160, all courses numbered 190-197 and 199 (except ENG 190, which may be taken for 2 units of engineering elective credit).

If specializing, refer to specialization descriptions in the Engineering Bulletin for course recommendations.

BIOLOGICAL SCIENCE ELECTIVES - Select a minimum of 9 (or 5 for Food Engineering only) units...

(for a combined lower and upper division total of 24 units of biological sciences). Of the 24 units, at least 9 must be upper division. All upper division courses in the College of Biological Sciences (with the exception of EXB 102, 112, 115, 118 through 149L and all courses numbered 190-199) may be used as biological sciences electives. The following courses may also be taken as biological sciences electives: ABT 161; ANS 118, 143, 144, 146; AMR 110A; ATM 133; AVS 100; CHA 101, 101L; ENT 100; ENH 102; ESPM 120, 182, 185 (offered at UC Berkeley); ESP 100, 110, 155; ETX 101, 112A, 131; FST 102A, 104L, 119, 120, 121, 128, 159; SSC 100; IDI 141; WFC 121. Students may choose other upper division courses with substantial biological content offered by the College of Agricultural and Environmental Sciences; consultation with a faculty adviser and approval by petition is required.

If specializing, refer to specialization descriptions in the Engineering Bulletin for course recommendations.

ENGLISH (Upper Division Requirement) Select one course from the following: (must pass course with C- or higher)

_____	4/	UWP 101	8-10 I, II, III	Advanced Composition	UWP 1 or 3; Must have completed 84 qtr. units.
_____	4/	UWP 102A	8-10 I, II, III	Writing in the Disciplines	UWP 1 or ENL 3; Upper Division Standing
_____	4/	UWP 102B	8-10 I, II, III	Writing in Biological Sciences	UWP 1 or ENL 3; Upper Division Standing
_____	4/	UWP 102C	8-10 II, III	Writing in History	UWP 1 or ENL 3; Upper Division Standing
_____	4/	UWP 102D	8-10 III	Writing in International Relations	UWP 1 or ENL 3; Upper Division Standing
_____	4/	UWP 102E	8-10 I, II, III	Writing in Engineering	UWP 1 or ENL 3; Upper Division Standing
_____	4/	UWP 102F	8-10 II	Writing in Food Science and Technology	UWP 1 or ENL 3; Upper Division Standing
_____	4/	UWP 102G	8-10 II, III	Writing: Bioregion	UWP 1 or ENL 3; Upper Division Standing
_____	4/	UWP 104A	8-10 I, II, III	Business Reports & Technical Communications	UWP 1 or ENL 3; Upper Division Standing
_____	4/	UWP 104B	8-10 I, II, III	Writing in the Professions: Law	UWP 1 or ENL 3; Upper Division Standing
_____	4/	UWP 104C	8-10 I, II, III	Writing in the Professions: Business	UWP 1 or ENL 3; Upper Division Standing
_____	4/	UWP 104D	8-10 I, II, III	Elementary and Secondary Education	UWP 1 or ENL 3; Upper Division Standing
_____	4/	UWP 104E	8-10 I, II, III	Writing in the Professions: Science	UWP 1 or ENL 3; Upper Division Standing
_____	4/	UWP 104F	8-10 I, II, III	Writing in the Health Profession	UWP 1 or ENL 3; Upper Division Standing
_____	ENGLISH COMPOSITION EXAM				Must have completed 70 quarter units.
				Offered following Saturdays	No units of credit for passing exam.
				10/28/06; 1/27/07; 4/28/07	

MINIMUM UPPER DIVISION UNITS REQUIRED: 87

MINIMUM UNITS REQUIRED FOR MAJOR: 181