ENGINEERING, BS, BIOSYSTEMS AND AGRICULTURAL ENGINEERING EMPHASIS

Natural Sciences, Mathematics, and Engineering (nsme) (https:// catalog.csub.edu/general-information/csub-information/school-naturalsciences-mathematics-engineering/)

Department of Physics and Engineering (https://catalog.csub.edu/ general-information/csub-information/school-natural-sciencesmathematics-engineering/department-physics-engineering/)

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www.csub.edu/engineering (http://www.csub.edu/engineering/)

Program Maps for Natural Sciences, Mathematics, and Engineering (https://programmap.csub.edu/academics/interest-clusters/4e942a6eb8e4-4b60-a1ae-334235acc581/)

Program Description

Engineering is a broad-based general engineering degree program. As such, it provides the graduate flexibility, breadth of technical knowledge, and communication skills so important in today's rapidly changing multidisciplinary and multicultural work environment. The student may opt for a BS in Engineering with an Emphasis in Biosystems and Agricultural Engineering, Energy and Power Engineering, Engineering Management, or Petroleum Engineering by the appropriate choice of required cognate and elective courses.

The Engineering program provides a curriculum and course of training that prepares the student not only for today's challenges, but also for future ones in a fast-paced, global, and diverse society. The program emphasizes the fundamentals of engineering and modern methods, processes and technologies, and also gives the students the tools to learn by themselves and to pursue life-long learning. Furthermore, the program and the faculty strive to ensure that graduates also attain a global understanding of the environmental, ethical and societal impacts of the technologies they help develop.

The program offers opportunities for team-based design projects in collaboration with local industries and public institutions, thus preparing students for careers in for-profit and non-profit organizations, or to further their education in graduate school. Faculty members of the Department of Physics and Engineering will be pleased to advise any students who may wish to pursue this major. For student learning objectives and more information, visit our website at www.csub.edu/engineering (http:// www.csub.edu/engineering/).

Program Requirements

•	icquirements	_	
Code	Title	Units	
General Educatio	-		
First-Year Semina		0	
	rea A: Foundational Skills	6	
Lower Division Area B: Natural Sciences ² 0			
Lower Division Area C: Arts and Humanities			
Lower Division Area D: Social and Behavioral Sciences ²			
Lower Division Area E: Student Enrichment and Lifelong Learning 0 (SELF) ²			
Lower Division Ar	ea F: Ethnic Studies	3	
American Institutions: Government and History			
Junior Year Diversity & Reflection (JYDR) 3			
Graduation Writing Assessment Requirement (GWAR) ² 0			
Upper Division Thematic Area C and D ² 0			
General Educatio	•	1	
General Education Subtotal ² 25			
Major Requireme	nts		
Lower Division			
ENGR 1618	Introduction to Engineering I	2	
ENGR 1628	Introduction to Engineering II	2	
ENGR 2070	Electric Circuits	4	
ENGR 2110	Analytic Mechanics, Statics	3	
ENGR 2120	Analytical Mechanics, Dynamics	3	
ENGR 2130	Mechanics of Materials	3	
ENGR 2140	Materials Science and Engineering	4	
ENGR 2350	Engineering Graphics	2	
Upper Division			
ENGR 3300	Engineering Modeling and Analysis	3	
ENGR 3310	Numerical Methods and Applications in Engineering	3	
ENGR 3110	Thermodynamics	4	
ENGR 3120	Fluid Mechanics	4	
ENGR 4110	Heat Transfer	4	
ENGR 4120	Machine Design	4	
ENGR 4900	Senior Design Project A	2	
ENGR 4910		2	
Upper Division Emphasis Electives			
ENGR 3400	Soil and Water Resource Management	3	
ENGR 3410	Agricultural Machines and Instrumentation	3	
ENGR 4410	Environmental Engineering	4	
ENGR 4420	Food and Bioprocess Engineering Unit Operation	s 3	
Emphasis Cognate	es ¹		
BIOL 2010	Introductory Biology - Cells	4	
or BIOL 2110	Introductory Biology - Animals		
or BIOL 2120	Introductory Biology - Plants		
Cognate Requirem	nents		
CHEM 1000	Foundations of Chemistry	3	
CHEM 1001	Foundations of Chemistry Laboratory	2	
CHEM 1600	Foundations of Physical Chemistry	2	
PHIL 3318	Professional Ethics	3	
PHYS 2210	Physics for Scientists and Engineers I	4	

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PHVS 3510 Modern Physics	
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PHYS 3520 Scientific Computing	
PHYS 4700 Special Topics in Physics	
or PHYS 480 Research Participation	
MATH 2330 Multivariable and Vector Calculus for Engineers	
MATH 2531 Multivariable Calculus	
MATH 2532 Vector Calculus	
MATH 2533 Multivariable and Vector Calculus	
MATH 2540 Ordinary Differential Equations	
MATH 2610 Linear Algebra I	
MATH 3000 Mathematical Foundations	
MATH 3200 Probability Theory	
MATH 3210 Applied Statistical Computing and Multivariate Methods	
MATH 3300 Numerical Analysis	
MATH 4500 Partial Differential Equations	
Subtotal 95	
Additional Units 0	
Total Units 120	

¹ Although not required for the emphasis, students are strongly advised to take ENGR 3070 Analog Electronics and ENGR 4260 Economics of Engineer Design. In addition, students pursuing this emphasis are encouraged to undertake a design project related to biosystems and