

**California State University, Bakersfield
 REQUIREMENTS FOR THE MAJOR: ENGINEERING SCIENCES**

2021-2022 Catalog

Name	ID#
Phone	Email

CORE REQUIREMENTS:					
INTRODUCTORY COURSES (LD ENGR - 23 UNITS)					
		Units	Institution	Date	Grade
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	Analytic Mechanics – Dynamics	3			
ENGR 2130	Mechanics of Materials	3			
ENGR 2140	Materials Science & Engineering	4			
ENGR 2350	Engineering Graphics	2			

CORE REQUIREMENTS:					
INTERMEDIATE COURSES (UD ENGR - 26 UNITS)					
		Units	Institution	Date	Grade
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	Senior Design Project B	2			

CORE REQUIREMENTS:					
COGNATES (26 UNITS)					
		Units	Institution	Date	Grade
MATH 2310 or 2510	Calculus I	4			
MATH 2320 or 2520	Calculus II	4			
PHYS 2210	Physics for Scientists and Engineers I	4			
PHYS 2220	Physics for Scientists and Engineers II	4			
CHEM 1000	Foundations of Chemistry	3			
CHEM 1001	Introduction to Laboratory in Chemistry	2			
CHEM 1600	Foundations of Physical Chemistry	2			
PHIL 3318*	Professional Ethics	3			

ADDITIONAL COGNATES: MATHEMATICS AND SCIENCE ELECTIVES (7 UNITS minimum)

ANY MAJORS LEVEL BIO, CHEM, GEOL, OR PHYS; MATH 2530, 2540, 4500 (Biosystems & Agricultural Engineering Emphasis students must take BIOL 2010, 2110, or 2120; Petroleum Engineering Emphasis students must take GEOL 4060)

ELECTIVES: BIOSYSTEMS & AGRICULTURAL ENGINEERING EMPHASIS (UD ENGR 13 Units)

Courses	Units	Institution	Date	Grade
ENGR 3400	Soil and Water Resource Management	3		
ENGR 3410	Agricultural Machines and Instrumentation	4		
ENGR 4410	Environmental Engineering	3		
ENGR 4420	Food and Bioprocess Engineering Unit Operations	3		

ELECTIVES: ENERGY AND POWER ENGINEERING EMPHASIS (UD ENGR – 13 UNITS)

Courses	Units	Institution	Date	Grade
ENGR 4610	Conventional Energy Production	3		
ENGR 4620	Renewable Energy Production	3		
ECE 3370	Power Systems Fundamentals	4		
ECE 4380	Power System Operation with Renewable Energy Resources	3		

ELECTIVES: ENGINEERING MANAGEMENT EMPHASIS (UD ENGR – 13 UNITS)

Courses	Units	Institution	Date	Grade
ENGR 4200	Operations Research	3		
ENGR 4220	Project Management	3		
ENGR 4240	Quality Management	3		
ENGR 4260	Economics of Engineering Design	3		
	One additional unit that applies towards the BS in Engineering Sciences	1		

ELECTIVES: PETROLEUM ENGINEERING EMPHASIS (UD ENGR – 13 UNITS)

Courses	Units	Institution	Date	Grade
ENGR 4520	Petroleum Production Engineering	3		
ENGR 4530	Reservoir Engineering	4		
ENGR 4540	Drilling Engineering and Completion Technology	4		
	Two additional units that apply towards the BS in Engineering Sciences	2		

OTHER ELECTIVES:

Courses	Units	Institution	Date	Grade
ENGR 3070	Analog Electronics	3		
ENGR 4610	Conventional Energy Production	3		
ENGR 4620	Renewable Energy Production	3		
ENGR 4700	Special Topics in Engineering	1-3		
ENGR 4800	Research Participation	1-3		

Note: An emphasis in any of the three areas is not required – the 13 units of electives can be chosen from any subarea.

Note: Students must have a minimum of

1. College-level mathematics and basic sciences*: 30 semester units
2. Engineering** topics: 45 semester units

*PHIL 3318 does not count towards the 30 semester units.

**Not all ENGR courses qualify as engineering topics units. See advisor for details.

Approval:

Chair _____

Date _____