

# CHEMICAL ENGINEERING - PHARM TRACK - Catalog Year 2017

Total Credits = **127-128**

## Freshman Year Fall Semester

Course Code	Description	Cr
CHM 101	General Chemistry Lec I (A1)	3
CHM 102	General Chemistry I Lab	1
EGR 105	Foundations of Engineering I (A4)	1
MTH 141 +	Calculus I (A1, B3)	4
PHY 203	Elementary Physics I (A1)	3
PHY 273	Elementary Physics Lab I (A1)	1

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## Freshman Year Spring Semester

Course Code	Description	Cr
BIO 101	Principles of Biology I (A1)	3
BIO 103	Principles of Biology I Lab (A1)	1
CHM 112 +	General Chemistry II Lec	3
CHM 114	General Chemistry II Lab	1
ECN 201	Principles of Microeconomics (A2)	3
EGR 106	Foundations of Engineering II (A4)	2
MTH 142 +	Calculus II (B3)	4

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## Sophomore Year Fall Semester

Course Code	Description	Cr
CHE 212	Chemical Process Calculations	3
CHM 227 +	Organic Chemistry Lec I	3
MTH 243 +	Calculus for Functions of Several Vars (A1, B3)	3
	General Education Outcome(s)*	3
	General Education Outcome(s)*	3

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## Sophomore Year Spring Semester

Course Code	Description	Cr
BIO 341 <i>or</i> CMB 311	Cell Biology <i>or</i> Intro Biochemistry	3
CHE 232	Materials Science and Engineering	3
CHE 272	Intro to Chemical Engineering Calculations	3
CHE 313	Chemical Engineering Thermodynamics I	3
MTH 244	Differential Equations	3

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Admission to the COE required for enrollment in "300" level and higher COE courses. Admission requires at least a 2.0 cumulative GPA and a C- or higher in each of the following; EGR 105 & 106, CHM 101/102, MTH 141 & 142, PHY 203/273, and either PHY 204/274 *or* CHM 112/114

## Junior Year Fall Semester

Course Code	Description	Cr
BIO 341 <i>or</i> CMB 311	Cell Biology <i>or</i> Intro Biochemistry	3
BPS 301	Dosage Forms I	2
BPS 303	Dosage Forms II	2
BPS 305	Dosage Forms III	2
CHE 314	Chemical Engineering Thermodynamics II	3
CHE 347	Transfer Operations I	3

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## Junior Year Spring Semester

Course Code	Description	Cr
BPS 425	Current Good Manufacturing Processes	3
CHE 348	Transfer Operations II	3
CHE 364	Chemical Kinetics and Reactor Design	3
CMB 211	Intro Microbiology	4
PHY 204	Elementary Physics II (A1)	3
PHY 274	Elementary Physics Lab II (A1)	1

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## Senior Year Fall Semester

Course Code	Description	Cr
CHE 345	Chemical Engineering Lab I	2
CHE 425	Process Dynamics and Control	3
CHE 428	Professional Experience	1
CHE 449	Transfer Operations III	3
CHE 451	Plant Design and Economics I	3
	Approved Professional Elective**	3
	General Education Outcome(s)*	3

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## Senior Year Spring Semester

Course Code	Description	Cr
CHE 346	Chemical Engineering Lab II	2
CHE 452	Plant Design and Economics II (D1, C2)	3
	Approved Professional Elective**	3
	Approved Track Elective***	3-4
	General Education Outcome(s)*	3
	General Education Outcome(s)*	3

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\* **General Education Outcomes:** if all Outcomes are satisfied in fewer spaces than provided, you must take a course of your choice (Free Elective) to fill each remaining space in order to meet the required earned credit total of your degree plan. See the "General Education Outcomes" section at the bottom of page two for more information on satisfying these requirements.

\*\* **Professional Electives:** Half of the Professional Electives are to be 400-level or higher CHE courses taken at URI. In addition EGR 325 and EGR 326 are permissible approved professional electives. The remaining courses are to be 300-level or higher in natural sciences, 400-level or higher in engineering (BME, CHE, CVE, ELE, ISE, MCE, OCE), or 400-level or higher in MTH.

\*\*\* **Track Elective:** CHE 466, 548, 550, 574; BPS 503, 542; PHY 430, 545

*All professional and track electives require prior approval by CHE advisor.*

+ Course prerequisites include grade requirements in previous coursework, see catalog or eCampus course description for details

**CHEMICAL ENGINEERING - PHARMACEUTICAL TRACK - Catalog Year 2017 Total Credits = 127-128**

SPECIFIED MATHEMATICS, SCIENCE, AND ENGINEERING COURSES											
INTRODUCTORY ENGINEERING						ENGINEERING SCIENCE AND DESIGN					
Sem	Course	Cr	Grade	QP	Note	Sem	Course	Cr	Grade	QP	Note
	EGR 105 (A4)	1					CHE 212	3			
	EGR 106 (A4)	2					CHE 232	3			
		3					CHE 272	3			
MATHEMATICS							CHE 313	3			
	MTH 141 (A1 & B3)	4					CHE 314	3			
	MTH 142 (B3)	4					CHE 345 [capstone]	2			
	MTH 243 (A1 & B3)	3					CHE 346 [capstone]	2			
	MTH 244	3					CHE 347	3			
		14					CHE 348	3			
NATURAL SCIENCES							CHE 349	3			
	BIO 101 (A1)	3					CHE 364 (464)	3			
	BIO 103 (A1)	1					CHE 425	3			
	BIO 341	3					CHE 428 (328)	1			
	CHM 101 (A1)	3					CHE 451 [capstone]	3			
	CHM 102	1					CHE 452 (352) [capstone] (D1 & C2)	3			
	CHM 112	3									
	CHM 114	1						41			
	CHM 227	3				**PROFESSIONAL ELECTIVE					
	CMB 211	4						3			
	CMB 311	3						3			
	PHY 203 (A1)	3						6			
	PHY 273 (A1)	1				***TRACK ELECTIVE					
	PHY 204 (A1)	3						3-4			
	PHY 274 (A1)	1				PHARMACY					
							BPS 301	2			
							BPS 303	2			
							BPS 305	2			
							BPS 425	3			
		33						9			
*GENERAL EDUCATION OUTCOMES											
Sem	Course	Cr	Grade	QP	Note	Sem	Course	Cr	Grade	QP	Note
Science, Technology, Engineering, & Math (STEM) (A1)						Civic Knowledge & Responsibilities (C1)					
---	BIO, CHM, & PHY (see above)	15	---	---	---						
Social and Behavioral Sciences (A2)						Global Responsibilities (C2)					
	ECN 201	3				---	CHE 452 (see above)	---	---	---	---
Humanities (A3)						Diversity & Inclusion (C3)					
Arts & Design (A4)						Ability to Synthesize (D1)					
---	EGR 105 & 106 (see above)	3	---	---	---	---	CHE 452 (see above)	3	---	---	---
Write Effectively (B1)						Grand Challenge (at least one course must be coded with a "G")					
Communicate Effectively (B2)						Free Elective					
						<i>If you fulfill all Outcomes in fewer spaces than indicated on page one, you must use those additional spaces to take course(s) of your choice to reach your degree credit total (127-128)</i>					
Mathematical, Statistical, or Computational Strategies (B3)											
---	MTH (see above)	11	---	---	---						
Information Literacy (B4)											

- \* **General Education Outcomes:** at least 40 credits must be completed. (A1-D1) must be met by at least three credits. A single course may satisfy one or two outcomes, and at least one course must be a "Grand Challenge". No more than twelve credits can be from the same course code except HPR. General education courses may also be used to meet requirements of your major(s) or minor(s) when appropriate.
- \*\* **Professional Electives:** Half of the Professional Electives are to be 400-level or higher CHE courses taken at URI. In addition EGR 325 and EGR 326 are permissible approved professional electives. The remaining courses are to be 300-level or higher in 400-level or higher in engineering (BME, CHE, CPE, CVE, ELE, ISE, MCE, OCE), or 400-level or higher in MTH.
- \*\*\* **Track Elective:** CHE 466, 548, 550, 574; BPS 503, 542; PHY 430, 545  
*All professional and track electives require prior approval by CHE advisor.*