

Notice of Change for **URI Catalog for Chemical Engineering (Biology Track and Pharmaceutical Track)**

Date: 11/19/2015

A. PROGRAM INFORMATION

1. Name of institution

University of Rhode Island

2. Name of department, division, school or college

Department: **Chemical Engineering**

College: **College of Engineering**

3. Intended initiation date of program change. Include anticipated date for granting first degrees or certificates, if appropriate.

Initiation date: **Fall 2016**

First degree date:

4. Intended location of the program: **URI, Kingston Campus**

5. Summary description of proposed program (not to exceed 2 pages): The proposed “track electives” for the Biology and Pharmaceutical tracks in chemical engineering broaden the choice of courses that our students can take besides BIO 352 and 437 in the BIO track, and CHE 574 in the Pharm track; those courses are now included in the “track electives” list. The changes we propose reflect trends in similar chemical engineering programs at other universities.

If applicable, please include the existing URI catalog language and proposed catalog language changes that relate to your request. **See page 2 & 3**

6. Signature of the President

David M. Dooley

Current Language re: Biology Track

The chemical engineering major with biology track requires 124 credits.

(Junior Year) Second semester: 17 credits

BIO 352 (4); CHE 348 (3), 364 (3); MIC 211 (4); and general education requirement (3).

(Senior Year) Second semester: 14 credits

BIO 437 (3); CHE 346 (2) [**capstone**], 352 (3) [**capstone**]; approved mathematics elective¹ (3); and approved professional elective² (3).

¹ *Mathematics Elective Requirement:* MTH 215 or any 300-, 400-, or 500-level MTH course **except** MTH 381.

² *Professional Elective Requirements:* Half of the professional electives are to be any 400-level or higher CHE courses taken at URI. The remaining courses are to be 300-level or higher in natural science, or 400-level or higher in engineering (BME, CHE, CPE, CVE, ELE, ISE, MCE, OCE), or 400-level or higher in MTH. **All professional electives require prior approval by CHE advisor.**

Proposed Language re: Biology Track

The chemical engineering major with biology track requires 123-125 credits.

(Junior Year) Second semester: 16-17 credits

Track Elective (3-4)³; CHE 348 (3), 364 (3); MIC 211 (4); and general education requirement (3).

(Senior Year) Second semester: 14-15 credits

Track Elective (3-4)³; CHE 346 (2) [**capstone**], 352 (3) [**capstone**]; approved mathematics elective¹ (3); and approved professional elective² (3).

¹ *Mathematics Elective Requirement:* MTH 215 or any 300-, 400-, or 500-level MTH course **except** MTH 381.

² *Professional Elective Requirements:* Half of the professional electives are to be any 400-level or higher CHE courses taken at URI. The remaining courses are to be 300-level or higher in natural science, or 400-level or higher in engineering (BME, CHE, CPE, CVE, ELE, ISE, MCE, OCE), or 400-level or higher in MTH. **All professional electives require prior approval by CHE advisor.**

³ Track Electives: CHE 466, 548, 550, 574; BPS 503, 542; BIO 352, 437, PHY 545
All Track Electives require advisor approval.

Current Language re: Pharmaceutical Track

The chemical engineering major with pharmaceutical track requires 126 credits.

Senior Year Second Semester: 17 credits

CHE 346 (2) [**capstone**], 352 (3) [**capstone**], 548 (3) or approved professional elective¹ (3), 574 (3); and general education requirement (6).

¹ *Professional Elective Requirements:* Half of the professional electives are to be 400–level or higher CHE courses taken at URI. The remaining courses are to be 300–level or higher in natural science, or 400–level or higher in engineering (BME, CHE, CPE, CVE, ELE, ISE, MCE, OCE), or 400–level or higher in MTH. **All professional electives require prior approval by CHE advisor.**

Proposed Language re: Pharmaceutical Track

The chemical engineering major with pharmaceutical track requires **126–127** credits.

Senior Year Second Semester: 17 credits

CHE 346 (2) [**capstone**], 352 (3) [**capstone**], **Approved Professional Elective¹ (3), Track Elective² (3–4)**; and general education requirement (6).

¹ *Professional Elective Requirements:* Half of the professional electives are to be 400–level or higher CHE courses taken at URI. The remaining courses are to be 300–level or higher in natural science, or 400–level or higher in engineering (BME, CHE, CPE, CVE, ELE, ISE, MCE, OCE), or 400–level or higher in MTH. **All professional electives require prior approval by CHE advisor.**

2 Track Electives: CHE 466, 548, 550, 574; BPS 503, 542; PHY 430, 545
All Track Electives require advisor approval.

CHEMICAL ENGINEERING - BIOLOGY TRACK - Class of 2019

Total Credits = **124**

Freshman Year Fall Semester

Course Code	Description	Cr	
CHM 101	General Chemistry I Lec [GE-N]	3	
CHM 102	General Chemistry I Lab	1	
EGR 105	Foundations of Engineering I	1	
MTH 141	Intro Calculus w/Analytic Geom [GE-N]	4	
PHY 203	Elementary Physics I Lec [GE-N]	3	
PHY 273	Elementary Physics I Lab [GE-N]	1	
		13	

Freshman Year Spring Semester

Course Code	Description	Cr	
BIO 101	Principles of Biology I [GE-N]	3	
BIO 103	Principles of Biology I Lab [GE-N]	1	
CHM 112	General Chemistry II Lec [GE-N]	3	
CHM 114	General Chemistry II Lab	1	
ECN 201	Principles of Microeconomics [GE-S]	3	
EGR 106	Foundations of Engineering II	2	
MTH 142	Intermed Calc with Analytic Geom [GE-MQ]	4	
		17	

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	3	
	General Education Elective*	3	
	General Education Elective*	3	
		15	

Sophomore Year Spring Semester

Course Code	Description	Cr	
BCH 311 <i>or</i> BIO 341	Intro Biochemistry <i>or</i> Cell Biology	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	
		15	

Junior Year Fall Semester

Course Code	Description	Cr	
BCH 311 <i>or</i> BIO 341	Intro Biochemistry <i>or</i> Cell Biology	3	
CHE 314	Chemical Engineering Thermodynamics II	3	
CHE 347	Transfer Operations I	3	
PHY 204	Elementary Physics II [GE-N]	3	
PHY 274	Elementary Physics II Lab [GE-N]	1	
	General Education Elective*	3	
		16	

Junior Year Spring Semester

Course Code	Description	Cr	
BIO 352	General Genetics	4	
CHE 348	Transfer Operations II	3	
CHE 364	Chemical Kinetics and Reactor Design	3	
MIC 211	Intro Microbiology	4	
	General Education Elective*	3	
		17	

Senior Year Fall Semester

Course Code	Description	Cr	
CHE 345	Chemical Engineering Lab I	2	
CHE 349	Transfer Operations III	2	
CHE 351	Plant Design and Economics I	3	
CHE 425	Process Dynamics and Control	3	
CHE 428	Professional Experience	1	
	Approved Professional Elective***	3	
	General Education Elective*	3	
		17	

Senior Year Spring Semester

Course Code	Description	Cr	
BIO 437	Fundamentals of Molecular Biology	3	
CHE 346	Chemical Engineering Lab II	2	
CHE 352	Plant Design and Economics II	3	
	Approved Mathematics Elective**	3	
	Approved Professional Elective***	3	
		14	

* **Note:** Refer to *specific* Chemical Engineering-Biology/Track General Education *course requirements* (see 2019 CHE-BIO Track Check Sheet).

** **Mathematics Elective:** MTH 215 or any 300-, 400-, or 500-level MTH course *except* MTH 381.

*** **Professional Electives:** Half of the Professional Electives are to be 400-level or higher CHE courses taken at URI. The remaining courses are to be 300-level or higher in natural sciences, or 400-level or higher in Engineering (BME, CHE, CPE, CVE, ELE, ISE, MCE, OCE), or 400-level or higher in MTH. *All professional electives require prior approval by CHE advisor.*

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	1					CHE 212	3			
	EGR 106	2					CHE 232 (332)	3			
		3					CHE 272	3			
MATHEMATICS							CHE 313	3			
	MTH 141 [GE-MQ]	4					CHE 314	3			
	MTH 142 [GE-MQ]	4					CHE 345 [capstone]	2			
	MTH 243	3					CHE 346 [capstone]	2			
	MTH 244	3					CHE 347	3			
		14					CHE 348	3			
NATURAL SCIENCES							CHE 349	2			
	BCH 311	3					CHE 351 [capstone]	3			
	BIO 101 [GE-N]	3					CHE 352 [capstone]	3			
	BIO 103 [GE-N]	1					CHE 364 (464)	3			
	BIO 341	3					CHE 425	3			
	BIO 352	4					CHE 428 (328)	1			
	BIO 437	3									
	CHM 101 [GE-N]	3									
	CHM 102	1									
	CHM 112 [GE-N]	3									
	CHM 114	1									
	CHM 227	3									
	MIC 211	4									
	PHY 203 [GE-N]	3									
	PHY 273 [GE-N]	1									
	PHY 204 [GE-N]	3									
	PHY 274 [GE-N]	1									
		40						40			
						*PROFESSIONAL ELECTIVES					
								3			
								3			
								6			
						**MATHEMATICS ELECTIVE					
								3			
GENERAL EDUCATION [GE] COURSES											
BREADTH At least one course in <i>each</i> of the Gen Ed Areas						DEPTH At least one additional course in <i>3 different</i> Gen Ed Areas Remainder are taken in <i>any</i> Gen Ed Area/Areas					
Sem	Course	Cr	Grade	QP	Note	Sem	Course	Cr	Grade	QP	Note
***English Communication-Writing [GE-ECw]						Natural Sciences [GE-N]					
	WRT	3				✓	<i>Satisfied by Required Courses</i>	15	---	---	---
Mathematical and Quantitative Reasoning [GE-MQ]						Mathematical and Quantitative Reasoning [GE-MQ]					
✓	<i>Satisfied by MTH 141</i>	4	---	---	---	✓	<i>Satisfied by MTH 142</i>	4	---	---	---
Fine Arts & Literature [GE-A]						***One additional course from: EC/ECw; A; FC; L; S					
		3					[GE-ECw; A; FC; L; S]	3			
Foreign Language/Culture [GE-FC]						Free Elective					
		3				---	<i>Not Required</i>	---	---	---	---
Letters [GE-L]						Other Courses (<i>not for degree credit</i>)					
		3									
Natural Sciences [GE-N]											
✓	<i>Satisfied by CHM 101</i>	3	---	---	---						
Social Sciences [GE-S]											
	ECN 201	3									

* Professional Electives: Half of the Professional Electives are to be 400-level or higher CHE courses taken at URI. The remaining courses are to be 300-level or higher in natural sciences, or 400-level or higher in engineering (BME, CHE, CPE, CVE, ELE, ISE, MCE, OCE), or 400-level or higher in MTH. *All professional electives require prior approval by CHE advisor.*

** Mathematics Elective: MTH 215 or any 300-, 400-, or 500-level MTH course *except* MTH 381.

*** Note the following *specific* requirements and restrictions for General Education [GE] electives:

-[GE-ECw] *Must* take at least *one (1)* General Education course in *writing* [GE-ECw].

-[GE-ECw] Can only take *one (1)* of the following **100-level** writing courses for General Education credit [GE-ECw]: WRT 104, or WRT 106.

CHE bio track

Current Junior Year *Spring* Semester

Course Code	Description	Cr
BIO 352	Genetics	4
CHE 348	Transfer Operations II	3
CHE 364	Chemical Kinetics and Reactor Desig	3
MIC 211	Intro Microbiology	4
	General Education Elective*	3

16 or 17

As posted in www.egr.uri.edu

Proposed Junior Year *Spring* Semester

Course Code	Description	Cr
	Track Elective ****	3/4
CHE 348	Transfer Operations II	3
CHE 364	Chemical Kinetics and Reactor Desig	3
MIC 211	Intro Microbiology	4
	General Education Elective*	3

16 or 17

As approved by COE on Oct. 6, 2015

Current Senior Year *Spring* Semester

Course Code	Description	Cr
BIO 437	Fundamentals of Molecular Biology	3
CHE 346	Chemical Engineering Lab II	2
CHE 352	Plant Design and Economics II	3
	Approved Mathematics Elective**	3
	Approved Professional Elective***	3

14

As posted in www.egr.uri.edu

Proposed Senior Year *Spring* Semester

Course Code	Description	Cr
****	Track Elective	3/4
CHE 346	Chemical Engineering Lab II	2
CHE 352	Plant Design and Economics II	3
	Approved Mathematics Elective**	3
	Approved Professional Elective***	3

14/15

As approved on Oct. 6, 2015

**** Track electives: CHE 466, 548, 550, 574; BPS 503, 542; BIO 352, 437; PHY 430, 545

s

All professional and track electives require advisor approval.

CHEMICAL ENGINEERING - PHARM TRACK - Class of 2019

Total Credits = **126**

Freshman Year Fall Semester

Course Code	Description	Cr	
CHM 101	General Chemistry I Lec [GE-N]	3	
CHM 102	General Chemistry I Lab	1	
EGR 105	Foundations of Engineering I	1	
MTH 141	Intro Calculus w/Analytic Geom [GE-N]	4	
PHY 203	Elementary Physics I Lec [GE-N]	3	
PHY 273	Elementary Physics I Lab [GE-N]	1	
		13	

Freshman Year Spring Semester

Course Code	Description	Cr	
BIO 101	Principles of Biology I [GE-N]	3	
BIO 103	Principles of Biology I Lab [GE-N]	1	
CHM 112	General Chemistry II Lec [GE-N]	3	
CHM 114	General Chemistry II Lab	1	
ECN 201	Principles of Microeconomics [GE-S]	3	
EGR 106	Foundations of Engineering II	2	
MTH 142	Intermed Calc with Analytic Geom [GE-MQ]	4	
		17	

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	3	
	General Education Elective*	3	
	General Education Elective*	3	
		15	

Sophomore Year Spring Semester

Course Code	Description	Cr	
BCH 311 <i>or</i> BIO 341	Intro Biochemistry <i>or</i> Cell Biology	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	
		15	

Junior Year Fall Semester

Course Code	Description	Cr	
BCH 311 <i>or</i> BIO 341	Intro Biochemistry <i>or</i> Cell Biology	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	
		15	

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	
MIC 211	Intro Microbiology	4	
PHY 204	Elementary Physics II [GE-N]	3	
PHY 274	Elementary Physics II Lab [GE-N]	1	
		17	

Senior Year Fall Semester

Course Code	Description	Cr	
CHE 345	Chemical Engineering Lab I	2	
CHE 349	Transfer Operations III	2	
CHE 351	Plant Design and Economics I	3	
CHE 425	Process Dynamics and Control	3	
CHE 428	Professional Experience	1	
	Approved Professional Elective***	3	
	General Education Elective*	3	
		17	

Senior Year Spring Semester

Course Code	Description	Cr	
CHE 346	Chemical Engineering Lab II	2	
CHE 352	Plant Design and Economics II	3	
CHE 548**	Separations for Biotechnology	3	
CHE 574	Biochemical Engineering	3	
	General Education Elective*	3	
	General Education Elective*	3	
		17	

* Note: Refer to *specific* Chemical Engineering-Pharmaceutical Track General Education *course requirements* (see 2019 CHE-PHARM Track Check Sheet).

** Or approved Professional Elective (see *** below).

*** Professional Electives: Half of the Professional Electives are to be 400-level or higher CHE courses taken at URI. The remaining courses are to be 300-level or higher in natural sciences, or 400-level or higher in engineering (BME, CHE, CPE, CVE, ELE, ISE, MCE, OCE), or 400-level or higher in MTH. *All professional electives require prior approval by CHE advisor.*

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	1					CHE 212	3			
	EGR 106	2					CHE 232 (332)	3			
		3					CHE 272	3			
MATHEMATICS							CHE 313	3			
	MTH 141 [GE-MQ]	4					CHE 314	3			
	MTH 142 [GE-MQ]	4					CHE 345	2			
	MTH 243	3					CHE 346 [capstone]	2			
	MTH 244	3					CHE 347 [capstone]	3			
		14					CHE 348	3			
NATURAL SCIENCES							CHE 349	2			
	BCH 311	3					CHE 351 [capstone]	3			
	BIO 101 [GE-N]	3					CHE 352 [capstone]	3			
	BIO 103 [GE-N]	1					CHE 364 (464)	3			
	BIO 341	3					CHE 425	3			
	CHM 101 [GE-N]	3					CHE 428 (328)	1			
	CHM 102	1					CHE 548*	3			
	CHM 112 [GE-N]	3					CHE 574	3			
	CHM 114	1						46			
	CHM 227	3				**PROFESSIONAL ELECTIVE					
	MIC 211	4						3			
	PHY 203 [GE-N]	3				PHARMACY					
	PHY 273 [GE-N]	1					BPS 301	2			
	PHY 204 [GE-N]	3					BPS 303	2			
	PHY 274 [GE-N]	1					BPS 305	2			
							BPS 425	3			
		33						9			
GENERAL EDUCATION [GE] COURSES											
BREADTH At least one course in <i>each</i> of the Gen Ed Areas						DEPTH At least one additional course in <i>3 different</i> Gen Ed Areas Remainder are taken in <i>any</i> Gen Ed Area/Area					
Sem	Course	Cr	Grade	QP	Note	Sem	Course	Cr	Grade	QP	Note
***English Communications-Writing [GE-ECw]						Natural Sciences [GE-N]					
	WRT	3				✓	Satisfied by Required Courses	15	---	---	---
Mathematical and Quantitative Reasoning [GE-MQ]						Mathematical and Quantitative Reasoning [GE-MQ]					
✓	Satisfied by MTH 141	4	---	---	---	✓	Satisfied by MTH 142	4	---	---	---
Fine Arts & Literature [GE-A]						***One additional course from: EC/ECw; A; FC; L; S					
		3					[GE-ECw; A; FC; L; S]	3			
Foreign Language/Culture [GE-FC]						Free Elective					
		3				---	Not Required	---	---	---	---
Letters [GE-L]						Other Courses (not for degree credit)					
		3									
Natural Sciences [GE-N]											
✓	Satisfied by CHM 101	3	---	---	---						
Social Sciences [GE-S]											
	ECN 201	3									

* Or approved Professional Elective (see *** below).

** Professional Electives: Half of the Professional Electives are to be 400-level or higher CHE courses taken at URI. The remaining courses are to be 300-level or higher in natural sciences, or 400-level or higher in engineering (BME, CHE, CPE, CVE, ELE, ISE, MCE, OCE), or 400-level or higher in MTH. All professional electives require prior approval by CHE advisor.

*** Note the following specific requirements and restrictions for General Education [GE] electives:

-[GE-ECw] Must take at least one (1) General Education course in writing [GE-ECw].

-[GE-ECw] Can only take one (1) of the following 100-level writing courses for General Education credit [GE-ECw]: WRT 104, or WRT 106.

CHE Pharmaceutical engineering track

Current Senior Year *Spring* Semester

Course Code	Description	Cr
CHE 346	Chemical Engineering Lab II	2
CHE 352	Plant Design and Economics II	3
CHE 548**	Separations for Biotechnology	3
CHE 574	Biochemical Engineering	3
	General Education Elective*	3
	General Education Elective*	
		14

As posted in www.egr.uri.edu

Proposed Senior Year *Spring* Semester

Course Code	Description	Cr
CHE 346	Chemical Engineering Lab II	2
CHE 352	Plant Design and Economics II	2
**	Approved Professional Elective **	3
****	Track-elective ****	3
	General Education Elective*	3
	General Education Elective*	
		14

As approved by COE on Oct. 6, 2015

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

All professional and track electives require advisor approval