

# Villanova University

## Department of Chemical Engineering

### Bachelor of Science in Chemical Engineering Curriculum

#### Freshman Fall Semester

ACS1000	Traditions in Conversation	3
CHM1151	General Chemistry I	4
CHM1103	General Chemistry Lab I	1
EGR1200	Egr Interdisciplinary Projects I	3
MAT1500	Calculus I	4
THL1000	Christian Faith and Life	3
<b>Total credits</b>		<b>18</b>

#### Freshman Spring Semester

ACS1001	Modernity & Its Discontents	3
CHM1156	General Chemistry II	4
EGR1205	Egr Interdisciplinary Projects II	3
MAT1505	Calculus II	4
PHY2400	Physics I, Mechanics	3
<b>Total credits</b>		<b>17</b>

#### Sophomore Fall Semester

CHE2031	Intro. Chemical Processes	3
CHM2211	Organic Chemistry I	3
CHM2201	Organic Chemistry Lab I	1
MAT2705	Diff. Eqs. & Linear Algebra	4
-----	Humanities/Social Sci. Elec.	3
-----	Humanities/Social Sci. Elec.	3
<b>Total credits</b>		<b>17</b>

#### Sophomore Spring Semester

CHE2032	ChemE Thermodynamics I	3
CHE2232	Fluid Mechanics	3
-----	Science Elective	3
-----	Science Lab Elective	1
-----	Humanities/Social Sci. Elec.	3
-----	Open Elective	3
<b>Total credits</b>		<b>16</b>

#### Junior Fall Semester

CHE3031	Heat Transfer	3
CHE3131	ChemE Thermodynamics II	3
CHE3931	Technical Communications	3
-----	ChemE Elective	3
-----	Science Elective	3
-----	Science Lab Elective	1
<b>Total credits</b>		<b>16</b>

#### Junior Spring Semester

CHE3032	Mass Transfer	3
CHE3332	ChemE Reactor Engineering I	3
CHE3932	ChemE Lab I	3
-----	Science Elective	3
-----	Open Elective	3
<b>Total credits</b>		<b>15</b>

#### Senior Fall Semester

CHE4131	Process Design I	3
CHE4331	Process Modeling & Analysis	3
CHE4931	ChemE Lab II	3
-----	ChemE Elective	3
-----	Humanities/Social Sci. Elec.	3
<b>Total credits</b>		<b>15</b>

#### Senior Spring Semester

CHE4232	Chemical Process Control	3
-----	ChemE Elective	3
-----	ChemE Elective	3
-----	Humanities/Social Sci. Elec.	3
-----	Open Elective	3
<b>Total credits</b>		<b>15</b>

**TOTAL CREDITS 129**

\*\* note: Science, Humanities/Social Science, Open, and ChemE Elective slots may be moved

### **Chemical Engineering Electives (4)**

Courses may be taken all in one area or selected from among different areas

Advanced Chemical Engineering  
CHE Math and Numerical Methods  
Transport Phenomena  
Process Control Theory  
Chemical Engineering Economics  
Chemical Reactor Engineering II  
Process Design II

Advanced Materials Engineering  
Introduction to Material Science  
Nanomaterials/Surface Science  
Polymer Science and Engineering  
Biomaterials

Biological Engineering Systems  
Introduction to Biotechnology  
Bioseparations  
Biomaterials

Sustainable Engineering Systems  
Introduction to Air Pollution Control  
Industrial Liquid and Solid Waste  
Climate Change & Sustainability  
Life Cycle/Impact Assessment  
Alternative Energy

#### **Research**

Chemical Engineering Research I  
Chemical Engineering Research II

Note: Students must take both research courses if selected. Only ChemE Research I counts as a chemical engineering elective. ChemE Research II counts as an open elective.

### **Science (3) and Science Lab (2) Electives**

One Science and Science Lab Elective must be CHM2212 and CHM2202 or CHM3416 and CHM3402

Note: Science Lab Electives cannot be fulfilled by AP credit (class of 2016 and beyond)

Approved Science Electives: BIO2105, BIO2106, BIO3105, BIO3351, BIO3595, BIO4205, BIO4505, CHM2212, CHM3212, CHM3311, CHM3312, CHM3416, CHM3417, CHM3511, CHM3514, CHM3515, CHM3516, CHM4222, CHM4313, CHM4512, CHM4611, CHM4621, CHM4622, CHM4623, PHY2402, PHY2416, PHY3310, PHY4000, PHY4002, PHY4100, PHY4102, PHY5100, PHY5102, PHY5200, PHY5300, PHY5500, PHY5502

Approved Science Lab Electives: BIO2105, BIO2106, BIO3105, BIO3595, BIO4205, BIO4505, CHM2202, CHM3301, CHM3402, CHM3501, CHM3503, CHM3505, CHM3506, CHM4202, CHM4601, CHM4603, PHY2403, PHY2417, PHY3311, PHY4001, PHY4003

### **Humanities/Social Science Electives (5)**

1 must be a THL (Theology and Religious Studies) course at the 2000 level or higher

1 must be an approved Ethics course in any department

1 course must be chosen from the following:

- THL course at the 2000 level or higher
- Any Philosophy course, including PHI 2150 (Engineering Ethics)
- EGR 2001 (The Humanistic Context) or ETH 2050 (College Ethics)
- Any Peace and Justice Course

2 courses from a humanities or social science department

#### **Humanities**

Arab & Islamic Studies  
Art History (not skills courses)  
Classical Studies  
Communications (not skills courses)  
English (literature courses)  
History  
Honors Program (must be accepted)  
Modern Languages (can not be native language)  
Philosophy  
Theology and Religious Studies (2000 and above)  
Theatre (not skills courses)

#### **Social Sciences**

Economics  
Geography and the Environment (selected course only)  
Peace and Justice  
Political Science  
Psychology  
Sociology  
Gender and Women's Studies (selected courses only)

Department of Chemical Engineering – 800 Lancaster Avenue – Villanova, PA 19085

phone: 610-519-4950 fax: 610-519-7354