Proposed Dual Degree Program in Biochemistry and Medicinal Chemistry

Degree/Program Concordance

Biochemistry			Medicinal Chemistry			Dual Program			Integration
Biology	100	2				Or Chem 100	100	2	a
	107	3		107	3		107	3	
	109	1					109	1	
	115	3					115	3	
	117	1					117	1	
	210	3					210	3	h
	214	3					214	3	h
	401	3	Or Biol403 (4)	401	3		401	3	
	402	3					402	3	h
	404	3					404	3	
	445	3					445	3	
Lab	4xx	3				(Chem 463)			b
Or Chem 451 (3)	451	2				Or Chem 451 (3)	451	2	
	495	1					495	1	c
				100	2	Or Biol 100			a
Chemistry	124	4		124	4		124	4	
	124	4		125	4		125	4	
	237	4		237	4		237	4	
	239	3		239	3		239	3	
	240	2		240	2		240	2	
	247	3		247	3		247	3	
				321	4		321	4	
	343	3		343	3		343	3	
Or Chem 344 (4)	438	3		344	4	Or Chem 344 (4)	438	3	d
				415	3		415	3	
				434	4		434	4	
				456	3		456	3	
				463	3		463	3	b
				467	3		467	3	
	485	1		485	1	Or Chem 495	485	1	
				495	1	(Biol 495)	495		c
Tech. Elective		3	Med.Chem. Elec		3	Dual Elective		3	e
		3			3			3	
		3						3	
		3							f
Math	151	5		151	5		151	5	
	152	5		152	5		152	5	
	251	4		251	4		251	4	
				252	4		252	4	f
	425	3				Or Chem513	425	3	g

Free Electives					3	Biol 210			h
					3	Biol 214			h
					3	Biol 402			h
Physics	123	4		123	4		123	4	
	221	4		221	4		221	4	
CS		2			2			2	
H/SS		21			21			21	
IPRO		6			6			6	
Total		127			127			145	

Integration Points

a. Either Chemistry or Biology ITP are accepted in the dual program. ITP provides content in professionalism, ethics and disciplinary communication. The AUs agree that this is similar enough between disciplines that those learning objectives can be achieved in either courses.
b. Analytical Development Lab (C463) replaces the second senior Biology Lab in the dual program. The objective is learning to conduct laboratory work in a relevant field. It is agreed that the analytical development lab, CHEM 463 satisfies this requirement.
c. Colloquium and seminar. Medicinal Chemistry requires CHEM485 and CHEM495, whereas Biochemistry requires BIO495 and CHEM495. All of these provide contact with and understanding of science in the field. Since each program required 2 1 credit classes, this is what is proposed in the dual. The students will be required to take BIOL495 and one of CHEM485 or 495.
d. In Biochemistry, students may select either Chemistry 438 or Chemistry 344. In the dual program this choice remains. Both are physical chemistry classes with the chemistry department and satisfy the relevant learning objectives.
e. The dual program has a stated aim of developing engaging focus classes at the interface of the two fields. Both units have agreed that students must select three dual program electives from the following list of eligible classes: Biology 327, 410, 426, 430, 475, Chemistry 416, 452, 455, 460, 461
f. Math 252 replaces one technical elective in the Biochemistry Program.
g. Either Math 425 or Chem513 may satisfy the statistics requirement in the dual program.
h. The 3 free electives in the Medicinal Chemistry degree are replaced by Biology 210, 214, and 402 in the dual program.

Program Requirements:

Chemistry		**50-51**
CHEM 100 or BIOL 100	Intro to the Profession	2
CHEM 124	Principles of Chemistry I with Lab	4
CHEM 125	Principles of Chemistry II w/Lab	4
CHEM 237	Organic Chemistry I	4
CHEM 239	Organic Chemistry II	3
CHEM 240	Organic Chemistry Lab	2
CHEM 247	Analytical Chemistry	3
CHEM 321	Instrumental Analysis	4
CHEM 343	Physical Chemistry I	3
CHEM 344 or CHEM 438	Physical Chemistry II or Physical Biochemistry	3-4
CHEM 415	Inorganic Chemistry	3
CHEM 434	Spec Methods in Id and Analysis	4
CHEM 456	Computational Biochem/Drug Des	3
CHEM 463	Analytical Method Develop Lab	3
CHEM 467	Medicinal Chemistry	3
CHEM 485 or 495	Chemistry Colloquium or Seminar in Special Topics	1
Biology Requirements		**29-30**
BIOL 107	General Biol Lecture	3
BIOL 109	General Biology Lab	1
BIOL 115	Human Biology	3
BIOL 117	Human Biology Lab	1
BIOL 210	Microbiology	3
BIOL 214	Genetics	3
BIOL 401	Introductory Biochemistry	3
BIOL 402	Metabolic Biochemistry	3
BIOL 404	Biochemistry Laboratory	3
BIOL 445	Cell Biology	3
BIOL 451 or CHEM 451	Biological Literature or Undergraduate Seminar	2-3
BIOL 495	Biology Colloquium	1
Medicinal Chemistry and Biochemistry Technical Electives		**(9)**
Select 3 of the following		
BIOL 327	Introduction to Immunology	3
BIOL 410	Advanced Human Genetics	3
BIOL 426	Population Genetics	3
BIOL 430	Bioinformatics	3
BIOL 475	Microbial Genomics	3
CHEM 416	Advanced Chemistry Laboratory	3

CHEM 452	Cheminformatics	3
CHEM 455	Advanced Organic Chemistry	3
CHEM 460	Bioanalytical Chemistry	3
CHEM 461	Bioanalytical Chemistry Lab	3
Mathematics Requirements		**18**
MATH 151	Calculus I	5
MATH 152	Calculus II	5
MATH 251	Multivariate & Vector Calculus	4
MATH 252	Introduction to Diff Equations	4
MATH 425 or CHEM 513	Statistical Methods	3
Physics Requirements		**8**
PHYS 123	General Physics I: Mechanics	4
PHYS 221	Gen Physics II: Elect&Magntism	4
Computer Science Requirement		**2**
CS 105 or CS110 or BIOL104	Intro to Computer Programming or Computing Principles or Linux and Perl Programming	2-3
or CS 110	Computing Principles	
Humanities and Social Sciences Requirements		**21**
See Illinois Tech Core Curriculum, sections B and C		
Interprofessional Projects (IPRO)		**6**
See Illinois Tech Core Curriculum, section E		
Total Credit Hours		**145 Minimum**

Sample Curriculum

YEAR 1			
SEMESTER 1	CREDIT HOURS	SEMESTER 2	CREDIT HOURS
BIOL 107	3	BIOL 115	3
BIOL 109	1	BIOL 117	1
CHEM 124	4	CHEM 125	4
MATH 151	5	MATH 152	5
Humanities 200-level Course	3	CHEM 100	2
CS 105 or 110	2	Social Sciences Elective	3
	18		18
YEAR 2			
SEMESTER 1	CREDIT HOURS	SEMESTER 2	CREDIT HOURS

CHEM 237	4	CHEM 239	3
BIOL 214	3	CHEM 240	2
MATH 251	4	CHEM 247	3
PHYS 123	4	MATH 425	3
H/SS Elective	3	BIOL 210	3
		PHYS 221	4
	18		18
YEAR 3			
SEMESTER 1	CREDIT HOURS	SEMESTER 2	CREDIT HOURS
CHEM 321	4	BIOL 402	3
CHEM 463	3	H/SS Elective x 2	6
BIOL 401	3	CHEM 456	3
MATH 252	4	Technical Elective	3
BIOL 445	3	CHEM 247	3
CHEM 485	1	BIOL 495	1
	18		21
YEAR 4			
SEMESTER 1	CREDIT HOURS	SEMESTER 2	CREDIT HOURS
Technical Elective	3	BIOL 451	2
CHEM 415	3	CHEM 434	4
CHEM 343	3	BIOL 404	3
H/SS Elective	3	CHEM 438	3
IPRO	3	CHEM 467	3
Technical Elective	3	IPRO	3
	18		18

*Summer classes can alleviate the schedule and is a more feasible option