

BS Biochemistry revision 2017

This has been approved by:

- Biology, 2nd feb 2017
- The chair and relevant faculty within chemistry

Rationale

A required class, CHEM344 had its prerequisites changed to include MATH252, which is not required in this program. This program does not include any free electives. Students surveyed expressed a general unwillingness to take an additional MATH class (they take MATH151, 152, 251, 425). This has prevented students from registering for CHEM344 and thus from completing their program. Currently this is being handled in an ad hoc fashion, mostly by override permits.

CHEM344 is the second part of a 2 semester physical chemistry sequence within chemistry. Biochemistry majors also are required take the first course, CHEM343, and will continue to do so. We have worked with chemistry to identify an alternative course with physical chemistry content, CHEM 438, which does not have this prerequisite course issue for biochemistry majors. This course is in fact viewed as preferable, since it has a different focus, on biochemically relevant physical chemistry, in contrast to the quantum mechanical focus of CHEM344.

The solution being proposed is to:

- change the requirement of CHEM344 to (CHEM344 4 c.h. or CHEM438 3 c.h.).

This allows those students:

- interested in the chemistry majors Pchem sequence and willing to get the MATH252 prerequisite on their own to continue to take CHEM344,
- other students either wishing to take a course with this different focus, or unwilling to take MATH252 to take CHEM438

This change reduces the c.h. range from 127-128 to 126-128, depending on this election.

Course descriptions

CHEM344 Physical Chemistry II

Introduction to quantum mechanics. Applying quantum mechanics to chemical systems. Atomic structure and spectra. Molecular structure and spectroscopy. Statistical mechanics. Chemical kinetics. The laboratory will include experiments dealing with thermochemistry, phase equilibria, chemical kinetics, spectra, molecular structure, and treatment of data.

Prerequisites: [(CHE 202 with min. grade of D) OR (CHEM 247 with min. grade of D)] AND [(CHEM 343 with min. grade of D)] AND [(MATH 252 with min. grade of D)] AND [(PHYS 221 with min. grade of D)]

CHEM438 Physical Biochemistry

The principles and techniques of thermodynamics, kinetics and spectroscopy applied to biological macromolecules are introduced. Contents to be covered include: interpretation of entropy and enthalpy driven processes, intra- and intermolecular interactions, biochemical equilibrium, free energy driven protein or ion transport, DNA and protein stability, derivation of rate of reaction from reaction mechanism, enzyme kinetics, principles and applications of spectroscopy for proteins and nucleic acids.

Pre-requisites: [CHEM 239] and [CHEM 343] or equivalencies.

Required courses

Bachelor of Science in Biochemistry

	Credit Hours
Biology Requirements	34-35
BIOL 100, 107, 109, 115, 117 210, 214,210, 401, 402, 445, 2 of (404,431,446), 451 (or CHEM451), 495	
Chemistry Requirements	27-28
CHEM 124, 125, 237, 239, 240, 247, 343, (344 or 438), 485	
Physics Requirements	8
PHYS 123, 221	
Technical Electives	11
Mathematics Requirements	17
MATH 151, 152, 251, 425	
Computer Science Requirement	2
CS 110 or 105 or 115	
Humanities and Social Science Requirements	21
I PRO	6
Total	126-128

Sample schedule

BIOL 100	2			BIOL 115	3		
BIOL 107	3			BIOL 117	1		
BIOL 109	1			H 1XX	3		
CHEM 124	4			CHEM 125	4		
MATH 151	5			MATH 152	5		
		15				16	
BIOL 214	3			BIOL 210	3		
PHYS 123	4			PHYS 221	4		
CHEM 237	4			CHEM 239	3		
MATH 251	4			CHEM 240	2		
CS 105	2			S 2XX	3		
		17				15	
BIOL 445	3						
BIOL 446	3			CHEM 344 or 438	4	or 3	
CHEM 485	1			tech elec	3		
CHEM 247	3			MATH 425	3		
CHEM 343	3			S 3xx	3		
S 3xx	3			IPRO	3		
		16				16	or 15
BIOL 495	1			BIOL 451	2		
BIOL 401	3			BIOL 402	3		
BIOL 404	3			H 3xx	3		
tech elec	3			tech elec	2		
H 3xx	3			tech elec 1xx	3		
IPRO	3			H/S 1xx	3		
		16				16	
						127	or 126

* or track elective for 3 c.h. in applied bioinformatics track, yielding TOTAL 127 c.h.