Molecular Biophysics and Biochemistry

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For class of 2026 and beyond. Earlier class years are encouraged to opt-in.
Alternatively, students may use the descriptions specific to their class year (http://catalog.yale.edu/ycps)

MB&B on one page

Members of the Department of Molecular Biophysics and Biochemistry (MB&B) are united by a common view that processes in biology are understood when molecular, chemical, kinetic and thermodynamic contributions to mechanisms have been elucidated. Faculty and students are joined by a shared fascination with biochemistry, physical chemistry, structural biology, computation, spectroscopy, macromolecular engineering, imaging and the molecular basis of disease.

The core elements of our discipline are:

Biophysics 3 credits for BA, 4 credits for BS and BS/MS
Biochemistry 3 credits
Science & Society 1/2 credit

Additional requirements in MB&B serve to:

- support the core elements as prerequisites or accompanying labs
- teach advanced topics that make use of these underpinnings
- teach the technology that enables scholarship in our discipline
- give opportunity to seniors to demonstrate mastery of the discipline in writing

Practical Skills 1 credit for BA, 2 credits for BS and 1 for BS/MS
Electives 1 credit for BA, 2 credits for BS and 6 for BS/MS
Senior Thesis 1 credit for BA and BS, 4 for BS/MS

Three quarters of MB&B graduates matriculate into PhD, MD and MD/PhD programs. Other recent graduates have joined companies specializing in finance, management consulting, biotechnology and pharma. Others have matriculated in law or business school and doctoral programs in the humanities. Still others have performed 1-2 years of public service, entered secondary education or joined the US armed forces as officers.

To directly engage students' interests and career goals, concentrations are available. These are named sets of electives, curated by the faculty, that count towards elective requirements and appear on your official Yale transcript. MB&B students may concentrate in **Medicine**, **Computational Biology & Bioinformatics**, **Biophysics and Structural Biology**, **Chemical Biology**, **Biochemistry**, or **Environment and Climate Change**.

Introductory Courses for First Years

We recommend you prioritize completing courses in the box below by the end of your first year. These courses are prerequisites for **MB&B 275 Biology at the Molecular Level**, a course open to everyone and that ~3/4 of MB&B students take as sophomores as their gateway into the major. Don't worry if you do not complete or place out of all 5 of these credits by the end of the first year! The MB&B major is still open to you.

CHEM 161	General Chemistry I
CHEM 134L	General Chemistry I lab (1/2 credit)
CHEM 165	General Chemistry II
CHEM 136L	General Chemistry II lab (1/2 credit)
MATH 112	Calculus I
BIOL 101	**Biochemistry and Biophysics (taught by MB&B Profs!)***
BIOL 102	Cell Biology and Membrane Physiology*

*Can be taken concurrently in with **MB&B 275** with instructor permission.

We further recommend students complete the 2.5 credits below as soon as they are able. These are prerequisites for courses that MB&B students typically take in their junior year.

CHEM 220	Organic Chemistry I	(~2/3 of MB&B students take as sophomores)
CHEM 222L	Organic Chem I Lab	(~2/3 of MB&B students take as sophomores)
MATH 115 or 116	Calculus II	(~1/4 of MB&B students defer this sophomore year)

The ½ credit courses below prepare students for conducting research in faculty labs across Yale and beyond, are co-taught with the Physics Department and are one of several ways to satisfy physics lab requirements for premedical studies. These modules are available to both first-year and 2nd year students and are offered every semester to help students plan and balance their coursework demands across the liberal arts.

MB&B 121L Introduction to Physics in Living Systems Lab I: Observation and Analysis
MB&B 124L Introduction to Physics in Living Systems Lab IV: Electricity, Magnetism & Radiation

n.b. MB&B 122L and 123L will be introduced beginning fall of 2024

First Year Advising: Students are welcome to declare MB&B as their major at anytime. Completing introductory course work is not required. We encourage declaration as it improves our ability to advise and send you pertinent information and dates. Once declared, MB&B students are assigned one academic faculty advisor through whom they may also petition to have courses waived. Declaration of major is non-binding at Yale and changing major does not require anyone's approval. If you are not a declared major, no problem! Just send questions to MBBUndergrad@yale.edu and watch your email for informational events.

Molecular Biophysics & Biochemistry

Degrees Offered	**B.A.**	**B.S.**	**B.S./M.S.**
Introductory Courses	CHEM 161/165 or CHEM 163/167, and CHEM 220 or 174 with CHEM 222L MATH 112, and MATH 115 or 116 BIOL 101 and 102, and for certain concentrations, BIOL 103 and 104		
Requirements for each degree	**9.5 course credits** including senior req	**12.5 course credits** including senior req	**18.5 course credits** including senior req
	Biophysics **(3 credits)** PHYS 170/171 (or above) and MB&B 275 or CHEM 332	**(4 credits)** PHYS 170/171 (or above) and MB&B 275 or CHEM 332 and 1 elective 300+	**(4 credits)** PHYS 180/181 (or above) and MB&B 275 or CHEM 332 and 1 elective 300+ as directed
	Biochemistry **(3 credits)** MB&B 300 and MB&B 301 CHEM 175 or any CHEM 200+		
	Science and Society **(1/2 credit minimum)** MB&B 268 or others as approved by DUS		
	Practical Skills Electives **(1 credit for B.A. / 2 credits for B.S.** from different categories with **at least 0.5 credits from MB&B)** Physics: PHYS 165L, MB&B 101L, CHEM 355L or … Biochem: MB&B 470/471, 251L, CHEM 355L or … Critical tools: S&DS 105, CPSC 112, MB&B 435 or ...		**(1 credit)** MB&B 470 or 471 completed by end of fifth term as part of senior req
	Seminar and Lecture Electives **(1 credit)** 1 MB&B elective at 200+ level	**(2 credits)** 1 x MB&B at 200+ level 1 x STEM at 200+ level	**(6 credits)** 2 x MB&B at 500+ level 4 x STEM at 500+ level
Concentrations	**Concentrations (optional)** Faculty curated sets of electives for students choosing to concentrate in **Biochemistry; Biophysics and Structural Biology; Chemical Biology; Computational Biology & Bioinformatics; Environment and Climate Change; Medicine.** Some concentrations require BIOL 103/104. Some require 1-3 additional credits. More specifice concentration requirements found in YCPS.		
Senior Requirements	**Senior Project (1 term)** MB&B 490 or MB&B 491		MB&B 570 and 571

Updated June 2023

Core elements of the Majors

Biophysics:

All Majors: A two (BS and BS/MS) semester sequence or one (BA) semester of biophysical chemistry. **MB&B 275 "Biology at the Molecular Level"**, is strongly recommended and ideally taken in the fall of year 2.
There is no accompanying lab requirement,

Alternatives to MB&B 275 are CHEM 332, CHEM 328, CENG 300, APHY 420, MENG 211. MB&B 275 cannot be taken after these courses.

BS majors: An additional 300+ elective in the physical natural sciences, physical engineering sciences, math, statistics, or computer science.
Accompanying labs are not required.

BS/MS majors: An additional 300+ elective emphasizing thermodynamics, statistical mechanics, quantum mechanics and/or spectroscopy, for example, CHEM 332, CHEM 328, CENG 300, APHY 420, MB&B 431.
Accompanying labs are not required.

All majors: A two semester sequence PHYS 170/171 or higher (BA and BS), or PHYS 180/181 or higher (BS/MS).
Accompanying labs for these classes are not required, but can be used to fulfill **Practical Skills** requirements described below.

Biochemistry:

MB&B 300/301 is a two semester, comprehensive sequence that defines MB&B's perspective on biochemistry. It is required of all majors.
Course substitutions for **MB&B 300/301** are **not** permitted.

The prerequisites for MB&B 300/301 is one semester of organic chemistry with lab, BIOL 101 and BIOL 102. While we recommend this course sequence be taken in year 3, about ⅓ of majors take this course sequence in year 2. MB&B 300 may be taken concurrently with organic chemistry. There is no accompanying lab to MB&B 300 or 301.

An additional 200+ level course in Chemistry, or CHEM 175, is required of all majors to further support understanding of Biochemistry. Majors typically take a second semester of organic chemistry, or inorganic chemistry, or options specified by particular concentrations. Accompanying labs are not required.

Science & Society:

The intersection of Molecular Biophysics & Biochemistry with human identity and society is critically important to your training. Matters of personal and group identity underpin the history of our discipline's development, the lived experience of its practitioners, the achievement of excellence by diverse cultures co-working in our labs and the interaction of faculty and graduates with the public in secondary schools, businesses, hospitals and government.

All majors take at least ½ credit of 100+ coursework in this area. One mechanism is to take the initiative and independently explore this interface by taking MB&B 268, "Society, Identity and STEM". This half-credit course meets in the second half of term and is taken simultaneously with any humanities course with significant focus on race, ethnicity, gender, sexuality, disability, veteran status, religion or any other aspect of human identity. MB&B 268 may be taken up to two times for a letter grade.

An alternative approach to fulfilling this requirement is to take one of many courses at Yale that directly address this topic. This includes AFAM 170, MB&B 107/268, HSHM 206/241/332/406/409/424/425/436/475/481, HIST 479, HLTH 140, SOCY 126/127/351, MCDB 375 or WGSS 270/457/741. Petitions for **course substitutions** (see below) are encouraged.

Additional Requirements

Practical Skills:

Many practical skills are vital to effective bench and computer-based research in biology and physics. Other practical skills benefit our ability to generate and test hypotheses and establish rigor when performing statistical analyses of data sets large and small. The juxtaposition of concepts and practical implementation in coursework results in lasting understanding.

BA majors take one credit and BS majors take two credits: across at least two of three categories: **Physics Lab**, **Biochemistry Lab** and **Critical Tools**. One or more courses (at least ½ credit) must be from MB&B. Courses that can be used to satisfy more than one category may not be double counted.

- **Physics Lab: MB&B 121L, 124L 364, 470/471***, PHYS 165L, 166L, CHEM 355L and others with **DUS approval** (see below).
- **Biochemistry Lab: MB&B 251L, 364, 470/471***, CHEM 355L, others including MCDB/EEB/BENG 200+ lab courses with **DUS approval.**
- **Critical Tools: MB&B 435, 470/471***, S&DS 100+, 238, CPSC 100+ and others with **DUS approval** (see below).

BS/MS majors: Practical Skills are incorporated into the senior requirement

*This is research for credit coursework. Up to two credits may be taken for a letter grade. Categorization of the coursework into one of the three skills is dependent on your project and/or the lab in which your project is conducted.

Electives

Seminar or lecture-based coursework as follows:

BA majors: one 200+ level in MB&B

BS majors: one 200+ level in STEM and one 200+ level in MB&B

BS/MS majors: six credits at the graduate level, 500+ in science, math, statistics or engineering. Two of the six from MB&B. Many graduate courses are ½ semester modules. It is common for more than six courses to be used to reach six credits.

Courses holding both 300+ undergraduate and 500+ graduate course number can be retroactively converted to graduate course numbers to fulfill this requirement after admission to the BS/MS program. Courses that hold a 100- or 200-level undergraduate listing in any subject cannot be used towards the six credit limit.

Senior Requirements

BA and BS majors: MB&B 490 is a one credit course that culminates in the writing of a thesis in the spring term of senior year.

BS/MS majors: Completion of 5 credits of research for credit: MB&B 470 or 471 is required by the end of fall semester of junior year. MB&B 570 and 571 is taken during senior year. All 5 credits of research are expected to take place within the same lab and culminate in a 50-page thesis and a public oral defense during the reading period of your final semester.

Concentrations

Concentrations in MB&B are sets of electives, curated by faculty, designed to focus attention onto specific subfields of Molecular Biophysics and Biochemistry. Concentrations appear on a student's official Yale transcript and are currently available in **Biophysics and Structural Biology**, **Chemical Biology**, **Computational Biology and Bioinformatics**, **Medicine**, **Biochemistry** and **Environment & Climate Change**.

Electives for concentrations can be used to fulfill the above elective options for the major which total 3.5 credits for BA majors, 6.5 credits for BS and 8.5 credits for BS/MS majors:

- CHEM 200+ or CHEM 175
  1 credit BA, BS and BS/MS
- 300+ in physical sci, engineering (not BENG), math, statistics, or computer sci.
  1 credit BS
- 300+ elective in thermodynamics, statistical mech, quantum and/or spectroscopy
  1 credit BS/MS
- Science and Society
  ½ credit BA, BS, BS/MS
- Practical Skills
  2 credit BS, 1 credit BA (1/2 credit of which must be in MB&B)
- STEM elective at 200+
  1 credit BS
- MB&B elective at 200+
  1 credit BA, BS
- MB&B elective at 500+
  2 credits BS/MS
- STEM elective at 500+
  4 credits BS/MS

For example, a BS major concentrating in **Medicine** must fulfill one course in statistics. S&DS 220 can fulfill the concentration's requirement and also count as a 200+ level STEM elective for the major. Sample schedules for each concentration for BS students are provided below.

Students can take up to one credit of upper level requirements as **Credit/D/Fail** (details below). For example, a BS major concentrating in **Medicine** and fulfilling their 300+ physical science requirement using CHEM 332 may take this class Cr/D/Fail and still have it count toward the major.

Placement exams and acceleration credits **do not** count towards completion of concentration-specific requirements. E.g. A BS Major who places out of 100-level statistics and is pursuing a concentration in **Computational Biology and Bioinformatics** is still expected to complete the concentration's requirement for 3 courses in MATH/S&DS/COMP.

Concentration in **Medicine**

The MB&B concentration in **Medicine** is designed for students with strong interests in the molecular basis of physiology and disease. MB&B offers a unique lens on these subjects as it was formed as a merger of the Yale Medical School Department of Biochemistry and the Yale College Department of Molecular Biophysics. MB&B faculty maintain labs in both schools (as well as West Campus) and instructs both Yale undergraduates and Yale medical school students. Majors aspiring to graduate studies in biomedical sciences, work in biotechnology or enter medical school are particularly encouraged to fulfill this concentration:

Requirements

Genetics and Development and Ecology and Evolution (1 credit): BIOL 103/104 or higher

Organic Chemistry (1 credit): Second term organic chemistry, CHEM 175 or CHEM 221
Accompanying lab is not required.

Statistics (1 credit): S&DS 100+ or (MATH 200+ in these subjects: linear algebra, probability, statistics or stochastic processes)

Psychology (1 credit): PSYC 110 or higher

Physics lab (2 courses totaling 1 credit or more): **MB&B 101L,** PHYS 165L, PHYS 166L or **MB&B 364** and others

Research (1 credit): Research for credit on a project focused on basic biological or biomedical research, **MB&B 470 or 471.** Alternatively, course-based undergraduate biomedical research experience (CURE), **MB&B 251L**, **MCDB 291L** and others. See **course substitutions** policy below.

Advanced (300+) Biomedical Lecture or Seminar (1 credit):

MB&B 449 Medical Impact of Basic Science
MB&B 445 Methods and Logic in Molecular Biology
MB&B 452 Biomedical Data Science, Mining and Modeling
BENG 350 Physiological Systems
MCDB 315 Pathobiology
MCDB 450 The Human Genome

Other choices for the above are encouraged and possible by petition.
See **course substitutions** policy below.

Note: The core BS major requires 12.5 credits while the core BA major requires 9.5 credits. For students with no advanced preparation in STEM, the concentration in **Medicine** (see sample schedules below) can be completed with 2 additional credits over the core BS major and 3 additional credits over the core BA requirements.

Computational Biology & Bioinformatics

The MB&B concentration in **Computational Biology & Bioinformatics** is designed for students with a combination of strong interests in computer science, data science, statistics and biology. Majors aspiring to graduate studies in computational biology, bioinformatics, medical informatics or biotechnology are particularly encouraged to fulfill this concentration:

Requirements

Genetics and Evolutionary Biol (1 credit, BA):	BIOL 103 and 104, or follow the BS guideline.
Genetics and Evolutionary Biol (1 credit, BS):	A 200+ elective in genetics, molecular biology or evolutionary biology. This elective may be used in place of MB&B's requirement for a 200+ elective in Chemistry: MCDB 200, MCDB 202, MCDB 310, **MB&B 330** and others.
Computer Sci, Math, Stats (2 credits, BA):	CPSC 201 and S&DS 100+
Computer Sci, Math, Stats (3 credits, BS):	CPSC 201 and (S&DS 238 or S&DS 241) and (CPSC 223 or S&DS 265). CPSC 223 may be used to fulfill the 300+ elective requirement in physical sci, physical engineering, math, statistics,or computer sci.

Advanced (300+) Computational Biology & Bioinformatics (1 credit):

MB&B 452 Biomedical Data Science, Mining and Modeling
CPSC 453 Unsupervised Learning for Big Data

Other choices for the above are encouraged and possible by petition.
See **course substitutions** policy below.

Note: The core BS major requires 12.5 credits while the core BA major requires 9.5 credits. For students with no advanced preparation in STEM, the **Computational Biology & Bioinformatics** concentration (see sample schedules below) can be completed with 3 additional credits over the core BS major and 3 additional credits over the core BA requirements.

Chemical Biology

Chemical Biology leverages the tools and concepts of chemistry to understand, leverage and/or manipulate biological processes. Students' interested in the MB&B concentration in **Chemical Biology** select electives from organic and inorganic chemistry as well as advanced courses in cell biology. Majors interested in additional studies in chemical biology, drug-development and/or biotechnology after graduation are particularly encouraged to fulfill this concentration:

Requirements

Organic Chemistry II (1.5 credits):
Second semester of organic chemistry with accompanying ½ credit lab.

Cell Biology and Chemistry (3 credits for BS):
2 x 200+ and 1 x 300+ electives in Chemistry or Cell Biology.
At least one of the credits must come from Cell Biology or Chemistry.

Cell Biology (1 credit for BA):
1 x 200+ electives in Cell-based biology

Research in Chemical Biology (1 credit): Research for credit on a Chemical Biology project (broadly interpreted), **MB&B 470 or 471.** Alternatively, **MB&B 364** or course-based undergraduate chemical biology research experience (CURE) by petition to DUS. See **course substitutions** policy below.

Advanced (300+) Chemical Biology Lecture or Seminar (1 credit):

MB&B 443	Advanced Eukaryotic Cell Biology
CHEM 419/424	Foundations of Chemical Biology I / II

Other choices for the above are encouraged and possible by petition.
See **course substitutions** policy below.

Note: The core BS major requires 12.5 credits while the core BA major requires 9.5 credits. The concentration in **Chemical Biology** (see sample schedules below) can be completed with one additional credit requirement over the core BS major and two additional credits over the core BA requirements.

Biochemistry

The MB&B concentration in Biochemistry is geared towards students seeking robust training in structure and function of nucleic acids and proteins in the context of life processes. Molecular length scale biochemistry is foundational to the mechanisms by which dynamic networks of molecular machines enable everything from cellular function to whole organism physiology. Failures in these networks are responsible for pathology in plants and animals, agriculture and medicine. MB&B majors interested in working in these fields directly after graduation, or who hope to pursue graduate studies including PhD and MD/PhD are particularly encouraged to fulfill this concentration:

Requirements

Genetics and Development and Ecology and Evolution (1 credit): BIOL 103/104 or above.

Molecular, Cellular or Organismal Biology 200+ (1 credit): MCDB 205, MCDB 202 and others

Research in Biochemistry (1 credit): Research for credit on a project with biochemical emphasis (broadly interpreted), **MB&B 470 or 471.** Alternatively, course-based undergraduate research experience (CURE) in biochemistry by petition to DUS.

Advanced (300+) Biochemistry Lecture or Seminar (2 credits for BS, 1 credit for BA):

MB&B 365 Biochemistry and our Changing Climate
MB&B 330 Modeling Biological Systems
MB&B 445 Methods & Logic in Molecular Biology
MB&B 449 Medical Impact of Basic Research
MB&B 443 Advanced Eukaryotic Cell Biology

Other choices for the above are encouraged and possible by petition.
See **course substitutions** policy below.

Note: The core BS major requires 12.5 credits while the core BA major requires 9.5 credits. For students with no advanced preparation in STEM, the concentration in **Biochemistry** (see sample schedules below) can be completed with two additional credit requirements over the core BS major and 3 additional credits over the core BA requirements.

Environment and Climate Change

The MB&B concentration in Environment and Climate Change is geared towards students seeking robust training in life processes as they affect, and are affected by the environment, human activity and climate change. MB&B majors interested in working in these fields directly after graduation, or who hope to pursue graduate studies including PhD are particularly encouraged to fulfill this concentration:

Requirements

Physical Environmental Science 300+ (1 credit for BS and BS/MS)

May be used to fulfill 300+ requirement in physical/engineering sciences.

EVST 362	Observing Earth from Space	EPS 335	Physical Oceanography
EPS 310	Isotope Geochemistry	CHEM 332	Thermodynamics
EPS 323	Climate Dynamics	CHEM 333	Quantum Mechanics

Environmental Chemistry 200+ (1 credit for BA, BS and BS/MS)

May be used to fulfill 200+ elective requirement in Chemistry

EVST 307	Organic Pollutants in the Env.	CHEM 252	Inorganic Chemistry
EPS 310	Isotope Geochemistry	ENVE 438	Environmental Org Chemistry

Math, Statistics and/or Computer Science (1 credit for BA, BS and BS/MS)

May be used to fulfill one credit of practical skills requirement for BA and BS

Math 120/121/222 or higher, S&DS 100+ or CPSC 100+

Ecology and Evolution 100+ (1 credit for BA, BS and BS/MS)

Courses at 200+ may be used to fulfill 200+ STEM requirement for BS

BIOL 104	Principles of Ecology and Evolutionary Biology
E&EB 225	Evolutionary Biology
ANTH 267	Human Evolution

Environmental Sciences 100+ (1 credit for BA, BS and BS/MS)

Courses at 200+ may be used to fulfill 200+ STEM requirement for BS

CENG 120	Intro to Environmental Engineering	EPS 101	Climate Change
EPS 140	Atmosphere, Ocean & Climate Change	EVST 223	General Ecology
EVST 265	Environmental Geomicrobiology	EPS 125	History of Life
EPS 232	Earth Surface Processes	EPS 261	Minerals & Human Health

Advanced (300+) Environment Lecture or Seminar (2 credits for BS and BS/MS, 1 credit for BA)

MB&B 365 may be used to fulfill 200+ MB&B requirement for all degrees

MB&B 365	Biochemistry & our Changing Climate	ENVE 441	Bio Processes in Environmental Engineering
ENVE 464	Engineering Solutions to Climate Change	EPS 323	Climate dynamics
EVST 415	Biotechnology & Developing World	ENVE 360	Green Engineering and Sustainability
EPS 355	Extraordinary Glimpses of Past Life	ENVE 438	Environ. Organic Chem.

Other choices for the above are encouraged and possible by petition.
See **course substitutions** policy below.
Note: The core BS major requires 12.5 credits while the core BA major requires 9.5 credits. For students with no advanced preparation in STEM, the concentration in **Environment and Climate Change** (see sample schedules below) can be completed with one additional credit requirements over the core BS and core BA requirements.

Biophysics and Structural Biology

The MB&B concentration in **Biophysics and Structural Biology** is designed for students with strong interests in life processes on the molecular length scale. Majors aspiring to graduate studies in biophysics, molecular medicine and biotechnology are particularly encouraged to fulfill this concentration.

Biophysics and Structural Biology are made possible by fundamental quantitative and physical tools such as linear algebra, Fourier analysis, x-ray diffraction, imaging and optical spectroscopy to measure biomolecular dynamics and atomic resolution structure. Seminar courses applicable to this area focus on the basic biology enabled by exquisitely specific macromolecular interactions, the molecular basis of disease and drug-design.

Requirements

Comp. Sci, Math, Statistics (1 credits, BS):	MATH 120 or 121 or 225 or S&DS 238 or CPSC 112
Comp. Sci, Math, Statistics (1 credits, BA):	MATH 120 or 121 or 225 or S&DS 100+ or CPSC 112
Biophysical Chemistry (1 credit, BS):	CHEM 332 or **MB&B 431** or any 300+ elective in thermodynamics, statistical mech, quantum mechanics or spectroscopy.

Research in Biophysics and Structural Biology (1 credit): Research for credit on a solution biophysical or structural biology project (broadly interpreted), **MB&B 470 or 471.** Alternatively, CHEM 355, or course-based undergraduate biophysical or structural biology research experience (CURE) by petition. See **course substitutions** policy below.

Tools and Quantitative Analysis (1 credits, BS): 200+ course with emphasis on measurement and/or modeling of energy, kinetics, or structure relevant to the molecular length scale. **MB&B 330/420/431/435** , CHEM 333/406/492 and others

Advanced Biophysics and Structural Biology Lecture or Seminar (1 credit):

MB&B 420 Macromolecular Structure and Biophysical Analysis

MB&B 431 Illuminating Biomolecular Mechanism with Structure

MB&B 529 Structural Biology and Drug Discovery

Other choices for the above are encouraged and possible by petition.
See **course substitutions** policy below.

Note: The core BS major requires 12.5 credits while the core BA major requires 9.5 credits. For students with no advanced preparation in STEM, the concentration in **Biophysics and Structural Biology** (see sample schedules below) can be completed with one additional credit requirements over the core BS major and 2 additional credits over the core BA requirements.

Policies and Procedures

Course Substitutions: Students may petition for **DUS approval** (see below) for course substitutions by assembling the relevant syllabi and writing a short justification (<300 words). Thoughtful requests in line with MB&Bs teaching goals are always welcome.

Credit/D/Fail: To encourage BA and BS majors to explore more challenging coursework, students are welcome to complete one credit requirement as Credit/D/Fail. This will not affect your ability to graduate with distinction, but does count against Yale's limit of 6 total Credit/D/Fail courses. Qualifying courses must be 400+ in MB&B, and 300+ in any other STEM subject. For BS/MS students, all required coursework must be taken for a letter grade.

MB&B Academic Advisors: Students are assigned a member of MB&B faculty for academic advising as soon as they declare their major. Requests for change in advisor should be sent to the registrar via direct email (elizabeth.vellali@yale.edu). Justification is not required nor is **DUS approval**.

DUS Approvals: DUS approvals for waivers, course substitutions, endorsement of petitions to the Committee on Honors and Academic Standing, applications to the BS/MS program etc, are initiated by an email of support from students' assigned **MB&B academic advisor** (see above). The academic advisor functions as the student's advocate on requests to the DUS with the MB&B registrar giving oversight and interfacing with the University registrar. Very important: one-on-one meetings by majors with their **MB&B academic advisor** during every registration period are logged. Failures to schedule meetings and missed meetings are factored into the DUS approval process.

Sample Schedules

Available below are sample student schedules for hypothetical students who arrive at Yale with no advanced preparation. For perspective:
About 1/3 of MB&B students place out of General Chemistry
About 4/5 of MB&B students place out of Calculus I.

Bachelor of Science (BS) in Molecular Biophysics & Biochemistry

Sample Schedule for Concentration in:

Medicine

				Credits							Additional Elements							
					Core Elements			Additional Requirements			Practical Skills		Concentration Specific					
Term	Dept	#	Name	Introductory	Biophysics (4)	Biochemistry (3)	Science & Society (0.5)	Practical Skills (2)	Electives at 200+ (1+1)	Senior Req. (1)	2+ categories, (P,B,C) ?	≥ 0.5 credit in MB&B?	Gen Dev Eco Evo Bio (1)	Organic Chemistry II (1)	Statistics (1)	Psychology (1)	Physics lab (1)	Research or CURE (1)	Biomedical Seminar (1)	Cr/D/F (0 or 1 only)
Fall	*CHEM*	*161*	*General Chemistry I*	1																
	CHEM	*134L*	*General Chemistry I Lab*	0.5																
	MATH	*112*	*Calculus I*	1																
	BIOL	*101*	*Biochemistry and Biophysics*	0.5																
	BIOL	*102*	*Cell Bio & Membrane Physiology*	0.5																
			Credit Load: 3.5																	
Spring	*CHEM*	*165*	*General Chemistry II*	1																
	CHEM	*136L*	*General Chemistry II Lab*	0.5																
	BIOL	*103*	*Genetics & Development*										0.5							
	BIOL	*104*	*Ecology & Evolution*										0.5							
	MB&B	121L	Physics in Living Systems Lab I					0.5			P	0.5					0.5			
	MB&B	124L	Physics in Living Systems Lab IV					0.5			P	0.5					0.5			
			Credit Load: 3.5																	
Fall	CHEM	220	Organic Chemistry	1																
	CHEM	222L	Lab for Organic Chemistry I	0.5																
	MB&B	275	Biology at the Molecular Level		1															
	MATH	*115*	*Calculus II*	1																
			Credit Load: 3.5																	
Spring	CHEM	221	Organic Chemistry of Life Processes			1								1						
	MB&B	268	Identity, Society, and STEM				0.5													
	MB&B	470	Research in Biochem & Biophys					1			B	1						1		
	S&DS	105	Intro to Statistics: Medicine					1			C				1					
			Credit Load: 3.5																	
Fall	PHYS	170	UniversityPhysics:LifeSciences		1															
	MB&B	300	Principles of Biochemistry I			1														
	PSYC	110	Introduction to Psychology													1				
			Credit Load: 3																	
Spring	PHYS	171	University Physics: Life Sciences		1															
	MB&B	301	Principles of Biochemistry II			1														
			Credit Load: 2																	
Fall	CHEM	332	Physical Chemistry I (Credit/D eligible)*		1															1
	MB&B	449	Medical Impact of Basic Research (Credit/D eligible)*						1										1	
			Credit Load: 2																	
Spring	MB&B	490	Senior Project							1										
	MB&B	445	Methods & Logic in Moleciular Biology (Credit/D eligible)*						1											
			Credit Load: 2																	

Italicized courses have placement exams or other mechanisms for placing out depending on prior knowledge.

Bachelor of Science (BS) in Molecular Biophysics & Biochemistry

Sample Schedule for Concentration in:

Computational Biology & Bioinformatics

				Credits							Additional Elements					
					Core Elements			Additional Requirements			Practical Skills		Concentration Specific			
Term	Dept	#	Name	Introductory	Biophysics (4)	Biochemistry (3)	Science & Society (0.5)	Practical Skills (2)	Electives at 200+ (1+1)	Senior Req. (1)	2+ categories, (P,B,C) ?	≥ 0.5 credit in MB&B?	Genetics & Evolution (1)	MATH / S&DS / CPSC (3)	Adv. Computational Biology (1)	Cr/D/F (0 or 1 only)
Fall	*CHEM*	*161*	*General Chemistry I*	1												
	CHEM	*134L*	*General Chemistry I Lab*	0.5												
	MATH	*112*	*Calculus I*	1												
	BIOL	*101*	*Biochemistry and Biophysics*	0.5												
	BIOL	*102*	*Cell Bio & Membrane Physiology*	0.5												
			Credit Load: 3.5													
Spring	*CHEM*	*165*	*General Chemistry II*	1												
	CHEM	*136L*	*General Chemistry II Lab*	0.5												
	MATH	*115*	*Calculus II*	1												
	CPSC	*112*	*Introduction to Programming*	1												
			Credit Load: 3.5													
Fall	CHEM	220	Organic Chemistry	1												
	CHEM	222L	Lab for Organic Chemistry I	0.5												
	MB&B	275	Biology at the Molecular Level		1											
	BIOL	*103*	*Genetics & Development*	0.5												
	BIOL	*104*	*Ecology & Evolution*	0.5												
			Credit Load: 3.5													
Spring	MB&B	268	Identity, Society, and STEM				0.5									
	MCDB	200	Molecular Biology			1							1			
	MATH	*120*	*Multivariate Calculus*	1												
	CPSC	201	Introduction to Computer Science						1					1		
			Credit Load: 3.5													
Fall	PHYS	170	UniversityPhysics:LifeSciences		1											
	MB&B	300	Principles of Biochemistry I			1										
	S&DS	238	Probability and Statistics					1			C			1		
			Credit Load: 3													
Spring	PHYS	171	University Physics: Life Sciences		1											
	MB&B	301	Principles of Biochemistry II			1										
			Credit Load: 2													
Fall	CPSC	223	Data Structures and Programming Techniques		1									1		
	MB&B	251L	Laboratory for Biochemistry					0.5			B	0.5				
			Credit Load: 1.5													
Spring	MB&B	490	Senior Project							1						
	MCDB	291L	Laboratory for Microbiology					0.5			B					
	MB&B	452	Biomed Data Sci, Mining & Modeling (Credit/D eligible)*						1						1	
			Credit Load: 2.5													

Italicized courses have placement exams or other mechanisms for placing out depending on prior knowledge.

Bachelor of Science (BS) in Molecular Biophysics & Biochemistry

Sample Schedule for Concentration in:

Biochemistry

				Credits							Additional Elements						
					Core Elements			Additional Requirements			Practical Skills		Concentration Specific				
Term	Dept	#	Name	Introductory	Biophysics (4)	Biochemistry (3)	Science & Society (0.5)	Practical Skills (2)	Electives at 200+ (1+1)	Senior Req. (1)	2+ categories, (P,B,C) ?	≥ 0.5 credit in MB&B?	Gen Dev Eco Evo Bio (1)	Molecular, Cell or Organismal Bio (1)	Research or CURE (1)	Advanced Biochemistry Lecture or Seminar (2)	Cr/D/F (0 or 1 only)
Fall	*CHEM*	*161*	*General Chemistry I*	1													
	CHEM	*134L*	*General Chemistry I Lab*	0.5													
	MATH	*112*	*Calculus I*	1													
	BIOL	*101*	*Biochemistry and Biophysics*	0.5													
	BIOL	*102*	*Cell Bio & Membrane Physiology*	0.5													
			Credit Load: 3.5														
Spring	*CHEM*	*165*	*General Chemistry II*	1													
	CHEM	*136L*	*General Chemistry II Lab*	0.5													
	BIOL	*103*	*Genetics & Development*										0.5				
	BIOL	*104*	*Ecology & Evolution*										0.5				
	MB&B	121L	Physics in Living Systems Lab I					0.5			P	0.5					
	MB&B	124L	Physics in Living Systems Lab IV					0.5			P	0.5					
			Credit Load: 3.5														
Fall	CHEM	220	Organic Chemistry	1													
	CHEM	222L	Lab for Organic Chemistry I	0.5													
	MB&B	275	Biology at the Molecular Level		1												
	MATH	*115*	*Calculus II*	1													
			Credit Load: 2.5														
Spring	MB&B	268	Identity, Society, and STEM				0.5										
	MB&B	470	Research in Biochem & Biophys					1			B	1			1		
			Credit Load: 1.5														
Fall	PHYS	170	UniversityPhysics:LifeSciences		1												
	MB&B	300	Principles of Biochemistry I			1											
	CHEM	252	Introductory Inorganic Chemistry			1											
			Credit Load: 3														
Spring	PHYS	171	University Physics: Life Sciences		1												
	MCDB	205	Cell Biology											1			
	MB&B	301	Principles of Biochemistry II			1											
			Credit Load: 3														
Fall	MB&B	365	Biochemistry and our Changing Climate						1							1	
	CHEM	332	Physical Chemistry I (Credit/D eligible)*		1												1
			Credit Load: 2														
Spring	MB&B	490	Senior Project							1							
	MB&B	445	Methods & Logic in Moleciular Biology (Credit/D eligible)*						1							1	
			Credit Load: 2														

Italicized courses have placement exams or other mechanisms for placing out depending on prior knowledge.

Bachelor of Science (BS) in Molecular Biophysics & Biochemistry

Sample Schedule for Concentration in:

Chemical Biology

				Credits							Additional Elements							
					Core Elements			Additional Requirements			Practical Skills		Concentration Specific					
Term	Dept	#	Name	Introductory	Biophysics (4)	Biochemistry (3)	Science & Society (0.5)	Practical Skills (2)	Electives at 200+ (1+1)	Senior Req. (1)	2+ categories, (P,B,C) ?	≥ 0.5 credit in MB&B?	Chemistry and Cell Biol (3)	Orgo II with Lab (1.5)	Research or CURE (1)	Chemical Biol Seminar (1)	Cr/D/F (0 or 1 only)
Fall	*CHEM*	*161*	*General Chemistry I*	1													
	CHEM	*134L*	*General Chemistry I Lab*	0.5													
	MATH	*112*	*Calculus I*	1													
	BIOL	*101*	*Biochemistry and Biophysics*	0.5													
	BIOL	*102*	*Cell Bio & Membrane Physiology*	0.5													
			Credit Load: 3.5														
Spring	*CHEM*	*165*	*General Chemistry II*	1													
	CHEM	*136L*	*General Chemistry II Lab*	0.5													
	MCDB	205	Cell Biology						1				1				
			Credit Load: 2.5														
Fall	CHEM	220	Organic Chemistry	1													
	CHEM	222L	Lab for Organic Chemistry I	0.5													
	MB&B	275	Biology at the Molecular Level		1												
	MATH	*115*	*Calculus II*	1													
			Credit Load: 2.5														
Spring	CHEM	221	Organic Chemistry of Life Processes			1								1			
	CHEM	223L	Lab for Organic Chemistry II					0.5			P			0.5			
	MB&B	268	Identity, Society, and STEM				0.5										
	MB&B	470	Research in Biochem & Biophys					1			B	1			1		
			Credit Load: 3														
Fall	PHYS	170	UniversityPhysics:LifeSciences		1												
	MB&B	300	Principles of Biochemistry I			1											
	CHEM	252	Introductory Inorganic Chemistry						1				1				
			Credit Load: 3														
Spring	PHYS	171	University Physics: Life Sciences		1												
	MCDB	345L	Exp. Techniques in Cell Biology					0.5			B						
	MB&B	301	Principles of Biochemistry II			1											
			Credit Load: 2.5														
Fall	CHEM	419	Foundations of Chemical Biology I (Credit/D eligible)*		1											1	
			Credit Load: 1														
Spring	MB&B	490	Senior Project							1							
	MB&B	443	Adv Eukaryotic Molecular Biology (Credit/D eligible)*						1				1				
			Credit Load: 2														

Italicized courses have placement exams or other mechanisms for placing out depending on prior knowledge.

Bachelor of Science (BS) in Molecular Biophysics & Biochemistry

Sample Schedule for Concentration in:

Environment & Climate Change

				Credits							Additional Elements								
					Core Elements			Additional Requirements			Practical Skills		Concentration Specific						
Term	Dept	#	Name	Introductory	Biophysics (4)	Biochemistry (3)	Science & Society (0.5)	Practical Skills (2)	Electives at 200+ (1+1)	Senior Req. (1)	2+ categories, (P,B,C) ?	≥ 0.5 credit in MB&B?	Phys Environ Sci 300+ (1)	Environ Chem 200+ (1)	Math/CPSC/S&DS (1)	Ecology/Evolution 100+ (1)	Intro Env Sci 100+ (1)	Adv Env Sci 300+ (2)	Cr/D/F (0 or 1 only)
Fall	*CHEM*	*161*	*General Chemistry I*	1															
	CHEM	*134L*	*General Chemistry I Lab*	0.5															
	MATH	*112*	*Calculus I*	1															
	BIOL	*101*	*Biochemistry and Biophysics*	0.5															
	BIOL	*102*	*Cell Bio & Membrane Physiology*	0.5															
			Credit Load: 3.5																
Spring	*CHEM*	*165*	*General Chemistry II*	1															
	CHEM	*136L*	*General Chemistry II Lab*	0.5															
	MATH	*115*	*Calculus II*	1															
	MB&B	121L	Physics in Living Systems Lab I					0.5			P	0.5							
	MB&B	124L	Physics in Living Systems Lab IV					0.5			P	0.5							
			Credit Load: 3.5																
Fall	CHEM	220	Organic Chemistry	1															
	CHEM	222L	Lab for Organic Chemistry I	0.5															
	MB&B	275	Biology at the Molecular Level		1														
	BIOL	*103*	*Genetics & Development*													0.5			
	BIOL	*104*	*Ecology & Evolution*													0.5			
			Credit Load: 3.5																
Spring	MB&B	268	Identity, Society, and STEM				0.5												
	MATH	225	Linear Algebra					1			C				1				
	EPS	140	Athmosphere Ocean & Climate Change														1		
			Credit Load: 2.5																
Fall	PHYS	170	UniversityPhysics:LifeSciences		1														
	MB&B	300	Principles of Biochemistry I			1													
	CHEM	252	Introductory Inorganic Chemistry			1								1					
			Credit Load: 3																
Spring	PHYS	171	University Physics: Life Sciences		1														
	MB&B	365	Biochemistry & Our Changing Climate						1									1	
	MB&B	301	Principles of Biochemistry II			1													
			Credit Load: 3																
Fall	ENV	441	Biological Processes in Environmental Engineering (Credit/D eligible)						1									1	
			Credit Load: 1																
Spring	MB&B	490	Senior Project							1									
	EVST	362	Observing Earth from Space (Credit/D eligible)		1								1						
			Credit Load: 2																

Italicized courses have placement exams or other mechanisms for placing out depending on prior knowledge.

Bachelor of Science (BS) in Molecular Biophysics & Biochemistry

Sample Schedule for Concentration in:

Biophysics and Structural Biology

				Credits							Additional Elements							
					Core Elements			Additional Requirements			Practical Skills		Concentration Specific					
Term	Dept	#	Name	Introductory	Biophysics (4)	Biochemistry (3)	Science & Society (0.5)	Practical Skills (2)	Electives at 200+ (1+1)	Senior Req. (1)	2+ categories, (P,B,C) ?	≥ 0.5 credit in MB&B?	Comp Sci Math Stats (1)	Adv Tools & Quant Analysis (1)	Biophysical Chemistry (1)	Research or CURE (1)	Advanced Biophysics Lecture or Seminar (1)	Cr/D/F (0 or 1 only)
Fall	*CHEM*	*161*	*General Chemistry I*	1														
	CHEM	*134L*	*General Chemistry I Lab*	0.5														
	MATH	*112*	*Calculus I*	1														
	BIOL	*101*	*Biochemistry and Biophysics*	0.5														
	BIOL	*102*	*Cell Bio & Membrane Physiology*	0.5														
			Credit Load: 3.5															
Spring	*CHEM*	*165*	*General Chemistry II*	1														
	CHEM	*136L*	*General Chemistry II Lab*	0.5														
	MATH	*115*	*Calculus II*	1														
	MB&B	121L	Physics in Living Systems Lab I					0.5			P	0.5						
	MB&B	124L	Physics in Living Systems Lab IV					0.5			P	0.5						
			Credit Load: 3.5															
Fall	CHEM	220	Organic Chemistry	1														
	CHEM	222L	Lab for Organic Chemistry I	0.5														
	MB&B	275	Biology at the Molecular Level		1													
	MATH	*115*	*Calculus II*	1														
			Credit Load: 2.5															
Spring	MB&B	268	Identity, Society, and STEM				0.5											
	MATH	225	Linear Algebra						1				1					
	MB&B	470	Research in Biochem & Biophys					1			B	1				1		
			Credit Load: 2.5															
Fall	PHYS	170	UniversityPhysics:LifeSciences		1													
	MB&B	300	Principles of Biochemistry I			1												
	CHEM	252	Introductory Inorganic Chemistry			1												
			Credit Load: 3															
Spring	PHYS	171	University Physics: Life Sciences		1													
	MB&B	301	Principles of Biochemistry II			1												
			Credit Load: 2															
Fall	MB&B	435	Quantitative Approaches in Biophysics and Biochemistry (Credit/D eligible)*					1			C	1		1				
	CHEM	332	Physical Chemistry I (Credit/D eligible)*		1										1			1
			Credit Load: 2															
Spring	MB&B	490	Senior Project							1								
	MB&B	529	Structural Biology and Drug Discovery (Credit/D eligible)*						1								1	
			Credit Load: 2															

Italicized courses have placement exams or other mechanisms for placing out depending on prior knowledge.

Bachelor of Science (BS) in Molecular Biophysics & Biochemistry

Sample schedule without concentration

				Credits							Additional Elements				
					Core Elements			Additional Requirements			Practical Skills				
Term	Dept	#	Name	Introductory	Biophysics (4)	Biochemistry (3)	Science & Society (0.5)	Practical Skills (2)	Electives at 200+ (1+1)	Senior Req. (1)	2+ categories, (P,B,C) ?	≥ 0.5 credit in MB&B?			
Fall	*CHEM*	*161*	*General Chemistry I*	1											
	CHEM	*134L*	*General Chemistry I Lab*	0.5											
	MATH	*112*	*Calculus I*	1											
	BIOL	*101*	*Biochemistry and Biophysics*	0.5											
	BIOL	*102*	*Cell Bio & Membrane Physiology*	0.5											
			Credit Load: 3.5												
Spring	*CHEM*	*165*	*General Chemistry II*	1											
	CHEM	*136L*	*General Chemistry II Lab*	0.5											
	MB&B	121L	Physics in Living Systems Lab I					0.5			P	0.5			
	MB&B	124L	Physics in Living Systems Lab IV					0.5			P	0.5			
			Credit Load: 3.5												
Fall	CHEM	220	Organic Chemistry	1											
	CHEM	222L	Lab for Organic Chemistry I	0.5											
	MB&B	275	Biology at the Molecular Level		1										
	MATH	*115*	*Calculus II*	1											
			Credit Load: 3.5												
Spring	CHEM	221	Organic Chemistry of Life Processes			1									
	MB&B	268	Identity, Society, and STEM				0.5								
	MB&B	470	Research in Biochem & Biophys					1			B	1			
			Credit Load: 3.5												
Fall	PHYS	170	UniversityPhysics:LifeSciences		1										
	MB&B	300	Principles of Biochemistry I			1									
			Credit Load: 3												
Spring	PHYS	171	University Physics: Life Sciences		1										
	MB&B	301	Principles of Biochemistry II			1									
			Credit Load: 2												
Fall	CHEM	332	Physical Chemistry I		1										
	MB&B	449	Medical Impact of Basic Research						1						
			Credit Load: 2												
Spring	MB&B	490	Senior Project							1					
	MB&B	445	Methods & Logic in Moleciular Biology						1						
			Credit Load: 2												

Italicized courses have placement exams or other mechanisms for placing out depending on prior knowledge.

Bachelor of Arts (BA) in Molecular Biophysics & Biochemistry

Sample Schedule for Concentration in:

Medicine

				Credits							Additional Elements							
					Core Elements			Additional Requirements			Practical Skills		Concentration Specific					
Term	Dept	#	Name	Introductory	Biophysics (3)	Biochemistry (3)	Science & Society (0.5)	Practical Skills (1)	MB&B 200+ Elective (1)	Senior Req. (1)	2+ categories, (P,B,C) ?	≥ 0.5 credit in MB&B?	Gen Dev Eco Evo Bio (1)	Organic Chemistry II (1)	Statistics (1)	Psychology (1)	Physics lab (1)	Research or CURE (1)	Biomedical Seminar (1)	Cr/D/F (0 or 1 only)
Fall	*CHEM*	*161*	*General Chemistry I*	1																
	CHEM	*134L*	*General Chemistry I Lab*	0.5																
	MATH	*112*	*Calculus I*	1																
	BIOL	*101*	*Biochemistry and Biophysics*	0.5																
	BIOL	*102*	*Cell Bio & Membrane Physiology*	0.5																
			Credit Load: 3.5																	
Spring	*CHEM*	*165*	*General Chemistry II*	1																
	CHEM	*136L*	*General Chemistry II Lab*	0.5																
	BIOL	*103*	*Genetics & Development*										0.5							
	BIOL	*104*	*Ecology & Evolution*										0.5							
	MB&B	121L	Physics in Living Systems Lab I					0.5			P	0.5					0.5			
	MB&B	124L	Physics in Living Systems Lab IV					0.5			P	0.5					0.5			
			Credit Load: 3.5																	
Fall	*CHEM*	*220*	*Organic Chemistry*	1																
	CHEM	*222L*	*Lab for Organic Chemistry I*	0.5																
	MB&B	275	Biology at the Molecular Level		1															
	MATH	*115*	*Calculus II*	1																
			Credit Load: 2.5																	
Spring	CHEM	221	Organic Chemistry of Life Processes			1								1						
	MB&B	268	Identity, Society, and STEM				0.5													
	MB&B	470	Research in Biochem & Biophys					1			B	1						1		
	S&DS	105	Intro to Statistics: Medicine					1			C				1					
			Credit Load: 2.5																	
Fall	PHYS	170	UniversityPhysics:LifeSciences		1															
	MB&B	300	Principles of Biochemistry I			1														
	PSYC	110	Introduction to Psychology													1				
			Credit Load: 3																	
Spring	PHYS	171	University Physics: Life Sciences		1															
	MB&B	301	Principles of Biochemistry II			1														
			Credit Load: 2																	
	MB&B	449	Medical Impact of Basic Research (Credit/D eligible)*						1										1	
			Credit Load: 1																	
Spring	MB&B	490	Senior Project							1										
			Credit Load: 1																	

Italicized courses have placement exams or other mechanisms for placing out depending on prior knowledge.

Bachelor of Arts (BA) in Molecular Biophysics & Biochemistry

Sample Schedule for Concentration in:

Computational Biology & Bioinformatics

				Credits							Additional Elements					
					Core Elements			Additional Requirements			Practical Skills		Concentration Specific			
Term	Dept	#	Name	Introductory	Biophysics (3)	Biochemistry (3)	Science & Society (0.5)	Practical Skills (1)	MB&B 200+ Elective (1)	Senior Req. (1)	2+ categories, (P,B,C) ?	≥ 0.5 credit in MB&B?	Genetics & Evolution (1)	MATH / S&DS / CPSC (2)	Adv. Computational Biology (1)	Cr/D/F (0 or 1 only)
Fall	*CHEM*	*161*	*General Chemistry I*	1												
	CHEM	*134L*	*General Chemistry I Lab*	0.5												
	MATH	*112*	*Calculus I*	1												
	BIOL	*101*	*Biochemistry and Biophysics*	0.5												
	BIOL	*102*	*Cell Bio & Membrane Physiology*	0.5												
			Credit Load: 3.5													
Spring	*CHEM*	*165*	*General Chemistry II*	1												
	CHEM	*136L*	*General Chemistry II Lab*	0.5												
	MATH	*115*	*Calculus II*	1												
	CPSC	*112*	*Introduction to Programming*													
			Credit Load: 3.5													
Fall	CHEM	220	Organic Chemistry	1												
	CHEM	222L	Lab for Organic Chemistry I	0.5												
	MB&B	275	Biology at the Molecular Level		1											
	S&DS	105	Intro to Statistics: Medicine					1			C			1		
			Credit Load: 3.5													
Spring	MB&B	268	Identity, Society, and STEM				0.5									
	BIOL	103	Genetics & Development										0.5			
	BIOL	104	Ecology & Evolution										0.5			
	CPSC	201	Introduction to Computer Science											1		
			Credit Load: 2.5													
Fall	PHYS	170	UniversityPhysics:LifeSciences		1											
	MB&B	300	Principles of Biochemistry I			1										
			Credit Load: 2													
Spring	PHYS	171	University Physics: Life Sciences		1											
	MB&B	301	Principles of Biochemistry II			1										
			Credit Load: 2													
Fall	CHEM	252	Introductory Inorganic Chemistry			1										
	MB&B	251L	Laboratory for Biochemistry					0.5			B	0.5				
			Credit Load: 1.5													
Spring	MB&B	490	Senior Project							1						
	MB&B	452	Biomed Data Sci, Mining & Modeling (Credit/D eligible)*						1						1	
			Credit Load: 2													

Italicized courses have placement exams or other mechanisms for placing out depending on prior knowledge.

Bachelor of Arts (BA) in Molecular Biophysics & Biochemistry

Sample Schedule for Concentration in:

Biochemistry

				Credits							Additional Elements						
					Core Elements			Additional Requirements			Practical Skills		Concentration Specific				
Term	Dept	#	Name	Introductory	Biophysics (3)	Biochemistry (3)	Science & Society (0.5)	Practical Skills (1)	MB&B 200+ Elective (1)	Senior Req. (1)	2+ categories, (P,B,C) ?	≥ 0.5 credit in MB&B?	Gen Dev Eco Evo Bio (1)	Molecular, Cell or Organismal Bio (1)	Research or CURE (1)	Advanced Biochemistry Lecture or Seminar (1)	Cr/D/F (0 or 1 only)
Fall	*CHEM*	*161*	*General Chemistry I*	1													
	CHEM	*134L*	*General Chemistry I Lab*	0.5													
	MATH	*112*	*Calculus I*	1													
	BIOL	*101*	*Biochemistry and Biophysics*	0.5													
	BIOL	*102*	*Cell Bio & Membrane Physiology*	0.5													
			Credit Load: 3.5														
Spring	*CHEM*	*165*	*General Chemistry II*	1													
	CHEM	*136L*	*General Chemistry II Lab*	0.5													
	BIOL	*103*	*Genetics & Development*										0.5				
	BIOL	*104*	*Ecology & Evolution*										0.5				
	MB&B	121L	Physics in Living Systems Lab I					0.5			P	0.5					
	MB&B	124L	Physics in Living Systems Lab IV					0.5			P	0.5					
			Credit Load: 3.5														
Fall	CHEM	220	Organic Chemistry	1													
	CHEM	222L	Lab for Organic Chemistry I	0.5													
	MB&B	275	Biology at the Molecular Level		1												
	MATH	*115*	*Calculus II*	1													
			Credit Load: 3.5														
Spring	MB&B	268	Identity, Society, and STEM				0.5										
	MB&B	470	Research in Biochem & Biophys					1			B	1			1		
			Credit Load: 1.5														
Fall	PHYS	170	UniversityPhysics:LifeSciences		1												
	MB&B	300	Principles of Biochemistry I			1											
	CHEM	252	Introductory Inorganic Chemistry			1											
			Credit Load: 3														
Spring	PHYS	171	University Physics: Life Sciences		1												
	MCDB	205	Cell Biology											1			
	MB&B	301	Principles of Biochemistry II			1											
			Credit Load: 3														
Fall	MB&B	365	Biochemistry and our Changing Climate						1							1	
			Credit Load: 1														
Spring	MB&B	490	Senior Project							1							
			Credit Load: 1														

Italicized courses have placement exams or other mechanisms for placing out depending on prior knowledge.

Bachelor of Science (BA) in Molecular Biophysics & Biochemistry

Sample Schedule for Concentration in:

Biophysics and Structural Biology

				Credits							Additional Elements					
					Core Elements			Additional Requirements			Practical Skills		Concentration Specific			
Term	Dept	#	Name	Introductory	Biophysics (3)	Biochemistry (3)	Science & Society (0.5)	Practical Skills (1)	MB&B 200+ Elective (1)	Senior Req. (1)	2+ categories, (P,B,C) ?	≥ 0.5 credit in MB&B?	Comp Sci Math Stats (1)	Research or CURE (1)	Advanced Biophysics Lecture or Seminar (1)	Cr/D/F (0 or 1 only)
Fall	*CHEM*	*161*	*General Chemistry I*	1												
	CHEM	*134L*	*General Chemistry I Lab*	0.5												
	MATH	*112*	*Calculus I*	1												
	BIOL	*101*	*Biochemistry and Biophysics*	0.5												
	BIOL	*102*	*Cell Bio & Membrane Physiology*	0.5												
			Credit Load: 3.5													
Spring	*CHEM*	*165*	*General Chemistry II*	1												
	CHEM	*136L*	*General Chemistry II Lab*	0.5												
	MATH	*115*	*Calculus II*	1												
	MB&B	121L	Physics in Living Systems Lab I					0.5			P	0.5				
	MB&B	124L	Physics in Living Systems Lab IV					0.5			P	0.5				
			Credit Load: 3.5													
Fall	CHEM	220	Organic Chemistry	1												
	CHEM	222L	Lab for Organic Chemistry I	0.5												
	MB&B	275	Biology at the Molecular Level		1											
	MATH	*115*	*Calculus II*	1												
			Credit Load: 3.5													
Spring	MB&B	268	Identity, Society, and STEM				0.5									
	MATH	225	Linear Algebra						1				1			
	MB&B	470	Research in Biochem & Biophys					1			B	1		1		
			Credit Load: 2.5													
Fall	PHYS	170	UniversityPhysics:LifeSciences		1											
	MB&B	300	Principles of Biochemistry I			1										
			Credit Load: 2													
Spring	PHYS	171	University Physics: Life Sciences		1											
	MB&B	301	Principles of Biochemistry II			1										
			Credit Load: 2													
Fall	CHEM	252	Introductory Inorganic Chemistry			1										
			Credit Load: 1													
Spring	MB&B	490	Senior Project							1						
	MB&B	529	Structural Biology and Drug Discovery (Credit/D eligible)*						1						1	
			Credit Load: 2													

Italicized courses have placement exams or other mechanisms for placing out depending on prior knowledge.

Bachelor of Arts (BA) in Molecular Biophysics & Biochemistry

Sample Schedule for Concentration in:

Chemical Biology

				Credits							Additional Elements						
					Core Elements			Additional Requirements			Practical Skills		Concentration Specific				
Term	Dept	#	Name	Introductory	Biophysics (3)	Biochemistry (3)	Science & Society (0.5)	Practical Skills (1)	MB&B 200+ Elective (1)	Senior Req. (1)	2+ categories, (P,B,C) ?	≥ 0.5 credit in MB&B?	Cell Biol (1)	Orgo II with Lab (1.5)	Research or CURE (1)	Chemical Biol Seminar (1)	Cr/D/F (0 or 1 only)
Fall	*CHEM*	*161*	*General Chemistry I*	1													
	CHEM	*134L*	*General Chemistry I Lab*	0.5													
	MATH	*112*	*Calculus I*	1													
	BIOL	*101*	*Biochemistry and Biophysics*	0.5													
	BIOL	*102*	*Cell Bio & Membrane Physiology*	0.5													
			Credit Load: 3.5														
Spring	*CHEM*	*165*	*General Chemistry II*	1													
	CHEM	*136L*	*General Chemistry II Lab*	0.5													
	MCDB	205	Cell Biology										1				
			Credit Load: 2.5														
Fall	CHEM	220	Organic Chemistry	1													
	CHEM	222L	Lab for Organic Chemistry I	0.5													
	MB&B	275	Biology at the Molecular Level		1												
			Credit Load: 2.5														
Spring	CHEM	221	Organic Chemistry of Life Processes			1								1			
	CHEM	223L	Lab for Organic Chemistry II					0.5			P			0.5			
	MB&B	268	Identity, Society, and STEM				0.5										
	MATH	*115*	*Calculus II*	1													
			Credit Load: 3														
Fall	PHYS	170	UniversityPhysics:LifeSciences		1												
	MB&B	300	Principles of Biochemistry I			1											
	MB&B	364	Light Microscopy						1						1		
			Credit Load: 3														
Spring	PHYS	171	University Physics: Life Sciences		1												
	MB&B	251L	Laboratory for Biochemistry					0.5			B	0.5					
	MB&B	301	Principles of Biochemistry II			1											
			Credit Load: 2.5														
Fall	CHEM	419	Foundations of Chemical Biology I (Credit/D eligible)*			1										1	
			Credit Load: 1														
Spring	MB&B	490	Senior Project							1							
			Credit Load: 1														

Italicized courses have placement exams or other mechanisms for placing out depending on prior knowledge.

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Sample Schedule for Concentration in:

Environment & Climate Change

				Credits							Additional Elements							
					Core Elements			Additional Requirements			Practical Skills							
Term	Dept	#	Name	Introductory	Biophysics (3)	Biochemistry (3)	Science & Society (0.5)	Practical Skills (1)	MB&B 200+ Elective (1)	Senior Req. (1)	2+ categories, (P,B,C) ?	≥ 0.5 credit in MB&B?	Environ Chem 200+ (1)	Math/CPSC/S&DS (1)	Ecology/Evolution 100+ (1)	Intro Env Sci 100+ (1)	Adv Env Sci 300+ (1)	Cr/D/F (0 or 1 only)
Fall	*CHEM*	*161*	*General Chemistry I*	1														
	CHEM	*134L*	*General Chemistry I Lab*	0.5														
	MATH	*112*	*Calculus I*	1														
	BIOL	*101*	*Biochemistry and Biophysics*	0.5														
	BIOL	*102*	*Cell Bio & Membrane Physiology*	0.5														
			Credit Load: 3.5															
Spring	*CHEM*	*165*	*General Chemistry II*	1														
	CHEM	*136L*	*General Chemistry II Lab*	0.5														
	MATH	*115*	*Calculus II*	1														
	MB&B	124L	Physics in Living Systems Lab IV					0.5			P	0.5						
			Credit Load: 3															
Fall	CHEM	220	Organic Chemistry	1														
	CHEM	222L	Lab for Organic Chemistry I	0.5														
	MB&B	275	Biology at the Molecular Level		1													
	BIOL	*103*	*Genetics & Development*												0.5			
	BIOL	*104*	*Ecology & Evolution*												0.5			
			Credit Load: 3.5															
Spring	MB&B	268	Identity, Society, and STEM				0.5											
	S&DS	100+	Intro to Statistics					1			C			1				
	EPS	140	Athmosphere Ocean & Climate Change													1		
			Credit Load: 2.5															
Fall	PHYS	170	UniversityPhysics:LifeSciences		1													
	MB&B	300	Principles of Biochemistry I			1												
	CHEM	252	Introductory Inorganic Chemistry			1							1					
			Credit Load: 3															
Spring	PHYS	171	University Physics: Life Sciences		1													
	MB&B	365	Biochemistry & Our Changing Climate						1								1	
	MB&B	301	Principles of Biochemistry II			1												
			Credit Load: 3															
Fall																		
			Credit Load: 0															
Spring	MB&B	490	Senior Project							1								
			Credit Load: 1															

Italicized courses have placement exams or other mechanisms for placing out depending on prior knowledge.

Bachelor of Science (BA) in Molecular Biophysics & Biochemistry

Sample schedule without concentration

Italicized courses have placement exams or other mechanisms for placing out depending on prior knowledge.

				Credits							Additional Elements				
					Core Elements			Additional Requirements			Practical Skills				
Term	Dept	#	Name	Introductory	Biophysics (4)	Biochemistry (3)	Science & Society (0.5)	Practical Skills (2)	Electives at 200+ (1+1)	Senior Req. (1)	2+ categories, (P,B,C) ?	≥ 0.5 credit in MB&B?			
Fall	*CHEM*	*161*	*General Chemistry I*	1											
	CHEM	*134L*	*General Chemistry I Lab*	0.5											
	MATH	*112*	*Calculus I*	1											
	BIOL	*101*	*Biochemistry and Biophysics*	0.5											
	BIOL	*102*	*Cell Bio & Membrane Physiology*	0.5											
			Credit Load: 3.5												
Spring	*CHEM*	*165*	*General Chemistry II*	1											
	CHEM	*136L*	*General Chemistry II Lab*	0.5											
	MB&B	121L	Physics in Living Systems Lab I					0.5			P	0.5			
	MB&B	124L	Physics in Living Systems Lab IV					0.5			P	0.5			
			Credit Load: 2.5												
Fall	CHEM	220	Organic Chemistry	1											
	CHEM	222L	Lab for Organic Chemistry I	0.5											
	MB&B	275	Biology at the Molecular Level		1										
	MATH	*115*	*Calculus II*	1											
			Credit Load: 2.5												
Spring	CHEM	221	Organic Chemistry of Life Processes			1									
	MB&B	268	Identity, Society, and STEM				0.5								
			Credit Load: 1.5												
Fall	PHYS	170	UniversityPhysics:LifeSciences		1										
	MB&B	300	Principles of Biochemistry I			1									
			Credit Load: 2												
Spring	PHYS	171	University Physics: Life Sciences		1										
	MB&B	301	Principles of Biochemistry II			1									
			Credit Load: 2												
	MB&B	449	Medical Impact of Basic Research						1						
			Credit Load: 1												
Spring	MB&B	490	Senior Project							1					
			Credit Load: 1												