

Pathway to Physician (M.D.)

What is a Physician? What's the job outlook?

Physicians diagnose and treat injuries and illnesses; they take medical histories, prescribe medications, and order, perform, and interpret diagnostic tests. They also counsel on diet and preventative healthcare. There are two kinds of physicians; M.D. (Medical Doctor) and D.O. (Doctor of Osteopathic Medicine). Both use the same methods of treatment, but D.O.s place additional emphasis on holistic (whole-body) patient care.



Employment for physicians is expected to grow 3 percent from 2020 to 2030. Most job growth is expected to result from the need to replace those who transfer to different occupations and/or retire. The growing and aging population is also expected to drive overall growth. As rates of chronic illness rise, consumers will seek high levels of care that use the latest technologies and therapies. As new technologies become more widely used, however, physician assistants and nurse practitioners may be used to reduce cost at hospitals and doctor's offices. The annual mean wage for a physician depends on their specialty and where they practice, but for a general internal medicine physician in the Denver Metro area it is \$224,360.*

*U.S. Bureau of Labor Statistics, U.S. Department of Labor, *Occupational Outlook Handbook*, Pharmacists, on the Internet at <https://www.bls.gov/ooh/healthcare/physicians-and-surgeons.htm#tab-7>

How do I become a Physician?

Physicians must have either a Medical Doctor (M.D.) or Doctor of Osteopathic Medicine (D.O.). No specific undergraduate degree is required to apply for medical school, but a bachelor's degree is required. Medical schools are highly competitive. In Colorado there is one M.D. program, the University of Colorado School of Medicine (CUSOM).

Applicants to CUSOM must submit transcripts, scores from the Medical College Admission Test (MCAT), a personal statement, and letters of recommendation. Once the initial application has been received and verified, a link to a secondary application is sent which would include an additional essay and taking the CASPer Test, a standardized assessment on non-cognitive skills, interpersonal characteristics, and personal values and priorities. The admissions committee will then select which applicants they wish to interview.

Medical school is 4 years of study, after which graduates will enter a residency program based on their specialty of interest. Residencies can last anywhere from 3-9 years, depending on the specialty. Sub-specialization would include additional training in a fellowship of 1-3 years.

All states require that physicians be licensed; requirements vary by state. To qualify for a license, candidates must graduate from an accredited medical school and complete residency training in their specialty. Licensing requirements include passing standardized national exams. M.D.s take the U.S. Medical Licensing Examination (USMLE).

Biology Faculty Advisors who can guide you for this path are:

Dr. Clare Hays

email: haysc@msudenver.edu

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Prerequisites for entry into medical school vary. Since medicine is a mixture of science and contact with people, courses in social and behavioral sciences, arts and humanities are of great value. Of course, you must demonstrate competence in the required science courses as well.

To check on the specific required courses for admission to medical schools around the country, you can consult Medical School Admission Requirements (MSAR), published by the Association of American Medical Colleges, www.aamc.org/students.

For further detail on admissions requirements at CUSOM, you can visit their website, <https://medschool.cuanschutz.edu/education/md-admissions>.

The following is a list of the minimum course requirements for admission to CUSOM.

- **General Biology with lab** – BIO 1080/1090 and BIO 1081/1091; 2 semesters
- **General Chemistry with lab** – CHE 1800/1801 and CHE 1810/1811; 2 semesters
- **Organic Chemistry with lab** – CHE 3100/3120 and CHE 3110/3130; 2 semesters
- **Math** – MTH 1110 and MTH 1120 (prerequisites for CHE & PHY); 2 semesters
- **College Physics** – PHY 2010/2030 and 2020/2040; 2 semesters
- **English Composition** – ENG 1010 and ENG 1020; 2 semesters

The following are highly recommended courses, although not required.

- **BIO 2310 & 2320** – Anatomy & Physiology I & II; 2 semesters
- **BIO 3050** – Cell Biology; 1 semester
- **BIO 3600** – Genetics; 1 semester
- **CHE 4310** – Biochemistry; 1 semester (many med schools now require this course)
- **MTH 1210** – Statistics
- **Psychology, Sociology, and Ethics**

**** Applicants should plan on completing the required courses by the end of junior year so that you will be prepared to take the MCAT in the spring of your junior year. The MCAT must be taken during or before September in the year of application. ****

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REQUIREMENTS FOR A MAJOR IN BIOLOGY
for 2020-2021 or future catalogs ONLY

A grade of "C-" or better is required for each BIO prefix course to count towards the major

Required Biology Courses for both the B.A. or the B.S. Degree

BIO 1080-3 General Biology I.....	3
BIO 1090-1 General Biology Lab I.....	1
BIO 1081-3 General Biology II.....	3
BIO 1091-1 General Biology Lab II.....	1
 BIO 3520-3 General Ecology.....	 3

Take ONE of these Genetics options:

- BIO 3600-4 General Genetics (no lab) 4
OR
 BIO 3610-4 Genetics: Principles & Analysis (has lab)..... 4

Pick ONE of these options:

- Option 1: BIO 2100-5 General Botany
OR
 Option 2: BIO 2400-5 General Microbiology
OR
 Option 3: Both BIO 2310-4 and BIO 2320-4 (Anatomy & Physiology I & II)
(You must take both semesters to get credit for this option)
OR
 Option 4: Either BIO 3200-4 Invertebrate Zoology or BIO 3260-4 Vertebrate Zoology
(If you wish to take both zoology courses, the other will count as an upper division elective)

Students are required to take a Senior Experience course:

Fulfills Senior Experience Requirement	
<input type="checkbox"/> BIO 4050-3 Advanced Cell & Molecular Biology	<input type="checkbox"/> BIO 4510-4 Microbial Ecology
<input type="checkbox"/> BIO 4230-3 Issues in Conservation Biology	<input type="checkbox"/> BIO 4540-4 Plant Ecology
<input type="checkbox"/> BIO 4300-3 Neurobiology	<input type="checkbox"/> BIO 4550-4 Animal Ecology
<input type="checkbox"/> BIO 4820-4 Developmental Biology	
<input type="checkbox"/> BIO 4850-3 Evolution	

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Elective Biology courses: Biology courses from 2000, 3000, and 4000 must be completed to bring the total of biology courses approved for the major to 40 credits. *At least 21 of these Biology credits must be from the 3000 or 4000 courses of the Department of Biology.*

Recommended Elective Courses from which to Choose:

- BIO 3050 – Cell Biology
- CHE 4310 – Biochemistry

Total Credit Hours in Biology (minimum of 40) _____

Upper Division Biology Credit Hours (minimum of 21) _____

B.S. Non-Bio Course Requirements:

CHE 1800-4 Gen Chemistry I _____

CHE 1801-1 Gen Chemistry I Lab _____

CHE 1810-4 Gen Chemistry II _____

CHE 1811-1 Gen Chemistry II Lab _____

CHOOSE YOUR PATH:

CHE 3100-4 Organic Chemistry I _____

CHE 3120-1 Organic Chemistry I Lab _____

AND

CHE 3110- 3 Organic Chemistry II _____

~OR~

‡CHE 3090- 4 Survey of Organic Chem _____

CHE 3120-1 Organic Chemistry I Lab _____

AND

‡CHE 4310-4 Biochemistry _____

‡ Note on CHE 3090 – Survey of Organic Chemistry - this class is no longer being offered

‡ Note on CHE 4310 – Biochemistry – requires completion of both Organic Chemistry I and II

Math Requirement:

Two Semesters of Math: _____

Choose from the following math courses:

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MTH 1108-1109 (Stretch College Algebra)*, MTH 1111 and MTH 1101 (College Algebra with lab), MTH 1110 (College Algebra), MTH 1112 (College Algebra through Modeling), MTH 1120 (Trigonometry), MTH 1115 and MTH 1116 (College Algebra through Modeling with lab), MTH 1210 (Intro to Statistics), MTH 1410 (Calculus I)**

MTH 1108-1109 is a Stretch Course and only counts as ONE of the required math courses for the BIO BS.

Students planning to take Calculus must take MTH 1108-1109, MTH 1110, or MTH 1111

Physics Requirement (Specific to Medical School)

College Physics I/II with lab*— PHY 2010/2030 or PHY 2020/2040

OR

General Physics I/II with lab** —PHY 2311/2321 or PHY 2331/2341

*Prerequisites for PHY 2010/2030 includes MTH 1120- College Trigonometry

**Prerequisites for PHY 2311/2321 includes MTH 1410 – Calculus I

General Studies Requirements (33 cr. total), please visit

<http://www.msudenver.edu/advising/facultystaff/generalstudiesrequirements/>

Total Credits (Minimum 120) _____

Total Upper Division Credits (Minimum 40 TOTAL) _____

What is your Minor? (required) _____

*Given the requirements for medical school, students on this track will be close to achieving a Chemistry minor, should they choose. This is not required for medical school, just an option for students to be aware of.