Western University of Health Sciences

Master of Science in Biomedical Sciences (MSBS)

2022/2023 Catalog

COVID-19 Impact

The contents of this 2022-2023 catalog reflect standard operating conditions for the academic year. However, the global COVID-19 pandemic has resulted in a rapidly changing environment for higher education, and Western University of Health Sciences will respond to those changes in the interest of the health and well-being of all our students, faculty, staff, and administration. Changes to COVID-19 Vaccine policy, procedure and practice may be necessary from time to time, and these changes will be published using typical communication channels, including mail, email, publication to the university web site, press releases, and other channels as deemed appropriate. These changes may supplement and supersede any inconsistent provisions found in this Catalog.

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Graduate College of Biomedical Sciences

Master of Science in Biomedical Sciences (MSBS)

Accreditation

Western University of Health Sciences is accredited by the Senior College and University Commission of the Western Association of Schools and Colleges (WASC). WASC's statement of accreditation status can be found at http://www.wascsenior.org/institutions/western-university-health-sciences. You may contact WASC at 985 Atlantic Avenue, Suite 100, Alameda, CA 94501. Phone: (310) 748-9001, Fax: (310) 748-9797, E-mail: wascsr@wascsenior.org. WASC is a non-profit organization that evaluates the quality and educational effectiveness of schools, colleges, and universities. WASC is one of six regional accreditation agencies in the United States. While it is not officially regulated by the government, it is regularly reviewed by the US Department of Education and the Council for Higher Education Accreditation.

Complaints Regarding WASC Accreditation Standards

Western University of Health Sciences is committed to meeting and exceeding the standards for accreditation of colleges and universities as described by the Accrediting Commission for Senior Colleges and Universities of the Western Association of Schools and Colleges (WASC). It is the policy of Western University of Health Sciences that a student, employee, or other constituent of the University that believes that they University may not be in compliance with the standards of accreditation has a right to file a complaint can view the complaint submission process at: http://www.wascsenior.org/comments.

General Information

Program Overview

A minimum of 40 semester credit hours are required for completion of the MSBS program. The program emphasizes training in modern methodology in the biomedical sciences with a broad range of skills and expertise acquired through core courses, electives, and research.

The MSBS currently offers a variety of learning experiences for students interested in pursuing a career or PhD in research, those interested in gaining acceptance to a professional health sciences program (e.g. DO, PA, DDS) or preparation for career opportunities in Translational Medicine, Bioinformatics, and Healthcare Bioinformatics. Please see the Curriculum Offerings Section of this catalog for specific requirements of the MSBS degree.

Final Year Teach-Out

Effective July 1, 2022, the Graduate College of Biomedical Sciences will be closed and no longer accept new student cohorts. With this closure, WesternU is committed to ensuring that the final MSBS year will be occur with minimal disruption to its students. Consequently, the final year of the MSBS program will consist of the same coursework as described in the previous catalog and incorporated herein. The final year of the program will be administered out of the Office of the VP for Research and Biotechnology, who also serves as the Acting Dean of the final year teach-out of the MSBS program.

Program Faculty

Program faculty are from the multiple colleges at WesternU. Their research interests span from cell biology, pharmacology, molecular biology, microbiology, biochemistry, structural biology, immunology, neuroscience, anatomy, and physiology, to genomics and bioinformatics.

Personal Competencies for Admission and Matriculation

A candidate for admission to the MSBS program must possess, or be able to achieve through a reasonable accommodation, certain intellectual, social, behavioral, and physical abilities, that would enable the individual to acquire the knowledge and technical skills needed to complete program curriculum and formulate a culminating thesis within their specific field of study. Upon matriculation to the program, the student must continue to possess, or be able to achieve through a reasonable accommodation, the personal competencies outlined below throughout their progression in the MSBS program. Graduates of the program are eligible for a myriad of possible futures including working in the biomedical sectors and further study toward a PhD or professional degree. As a result, it is preferred that students have the intellectual ability to learn, integrate, analyze, and synthesize numerical, visual, and textual information within the field of biomedical sciences' research. They should also be able to effectively and accurately integrate this information and communicate it to others by both oral and written means.

A candidate for the MSBS program is preferred to have the following abilities and skills and be able to perform all of the following essential functions, which include but are not limited to the areas below. For candidates or students who require a reasonable accommodation in order to meet the competencies outlined below, please contact the Harris Family Center for Disability and Health Policy (^{HF}CDHP) at (909) 469-5297.

Under all circumstances, a candidate or student should be able to perform the following in a reasonably independent manner, with or without a reasonable accommodation:

Intellectual and Cognitive Abilities

Candidates should demonstrate abilities in measurement, reasoning, analysis, and synthesis of acquired data and knowledge.

Communication

Candidates should be able to demonstrate oral and written communication skills, which include generating clear articulations of their research and formulating scientific arguments.

Collaboration

Candidates should demonstrate the ability to participate in an inclusive learning community such as working within a team amongst other students and laboratory staff.

Laboratory and Research Experience

Candidates are preferred to have a prior hands-on laboratory experience.

Ethical Standards

Candidates should demonstrate the ability to reason through ethically questionable situations.

Admissions Policies and Procedures

Non-Discrimination Policy

In accordance with all applicable federal, state, and local laws, Western University of Health Sciences (WesternU) is committed to ensuring a campus community free from unlawful discrimination. Accordingly, WesternU prohibits unlawful discrimination on the basis of race, color, national origin ancestry, citizenship, ethnicity, creed, religion or religious creed, sex or gender (including gender identity), marital status, sexual orientation, disability (both physical and mental) including HIV and AIDS, medical condition (cancer and genetic characteristics), pregnancy (which includes childbirth, breastfeeding and medical conditions related to pregnancy, childbirth or breastfeeding), age, genetic information, military and veteran status, or any other characteristic protected under applicable law, in the administration of its programs or activities. WesternU also prohibits unlawful harassment, including Sexual Harassment. Lastly, WesternU is committed to providing equal access to and equal opportunities to all members of its campus community in accordance with all applicable laws.

This non-discrimination policy applies to applicants, students, and alumni. Additional nondiscrimination information can be found in the Nondiscrimination, Anti-Harassment, and Anti-Retaliation Policy, located in the University Catalog.

Registration

All WesternU students are required to register by the registration deadlines specified by the University Registrar. Registration dates are posted on the Registrar's Office website. Failure to register by the deadline may be grounds for administrative withdrawal. All students registering after the posted deadline will be assessed a $30.00 per business day late fee.

Full tuition and fees and all prior debts must be paid in full on or by posted deadlines each academic year. Matriculation is subject to the satisfactory completion of all academic requirements and payment of all outstanding debts to the University. The receipt of the final transcript(s) from all colleges/universities attended and a physical examination with documentation of required immunizations (if applicable) prior to registration are additional requirements for incoming students.

Registration Late Fee Appeals

If you are assessed late fees for a registration period, you may submit an appeal to the Office of the Registrar. For additional information on the appeal process, please see the Registration Late Fees page on the Registrar's Office website.

Student Health Insurance Requirement

All full-time students at Western University of Health Sciences are required to have active health insurance while enrolled. All students are automatically assessed half of the entire year's insurance premium and will be enrolled in the student health insurance plan until they submit proof of coverage that meets the University's requirements. For additional information on student health insurance requirements and/or waiving out of the student health insurance plan, please see the Student Health Insurance page on the Registrar's Office website.

Student Initiated Changes in Enrollment Status

Course Add

Students may only add a class if less than 20% of the course has been completed. Requests submitted beyond this timeframe will not be permitted. To add a course the student must first meet with his/her research/thesis advisor. If he/she approves this request, the student must then get the written consent of the course director, followed by the Acting Dean of the GCBS. Finalized paperwork should then be submitted to the Office of Academic and Student Affairs, who will ensure it is sent over to the Registrar's office.

Course Drop/Withdrawal

Students may voluntarily drop a class by completing the necessary following the workflow as described above for adding courses. Course drops are processed as follows:

0-20% of Course Completed (Based on Course Start/End Dates)	Course is removed from student's registration and will not appear on student's academic transcript.
20-99% of Course Completed (Based on Course Start/End Dates)	Course is assigned a grade of 'W' to indicate the student withdrew from the course. 'W' grades will

	appear on the student's academic transcript but will not be included in the student's GPA calculation.
100% of Course Completed (Based on Course Start/End Dates)	Course is assigned the grade earned.

Time off Requests

The GCBS recognizes that occasionally a student must miss a mandatory curricular activity due to a required or an unavoidable circumstance. If a student needs to be excused for any length of time, he/she must submit a request using the Time-Off Request (TOR) Form available from the Office of Academic and Student Affairs. Students are allowed a maximum of three (3) absences per semester.

Timeframe for Submitting Requests

For **planned absences** (known in advance of the curricular activity) the TOR Form and all necessary documentation should be submitted no less than 14 days prior. Examples of planned absences include, but are not limited to, scheduled religious observances, interviews, conferences (see additional requirements below), immediate family weddings/funerals/graduations, surgeries, and other medical procedures that cannot be done during academic breaks.

For unplanned absences (known just prior to the curricular activity) the TOR Form must be submitted by the end of the scheduled curricular activity. If documentation is not available at the time, the TOR is submitted, documentation must be submitted prior to the scheduled make-up opportunity, or within 72 hours (whichever comes first). Requests may not be approved if documentation is received after 72 hours. If a student is absent due to an illness, a note from a health care provider is required for absences that exceed more than two (2) days.

Examples of unplanned absences include, but are not limited to, acute personal illness, a traffic accident, and acute illness or death of a family member.

Leave of Absence

A student may request a Leave of Absence (LOA) with the occurrence of a medical emergency or illness, personal issues, financial hardship, or military service. Students must be in good academic standing to be eligible for a Leave of Absence. For additional information on the University's Leave of Absence policy, please see 'Student Initiated Changes in Enrollment Status' in the University Catalog, General Academic Policies and Procedures section.

Withdrawal from University/Academic Program

Matriculation at the University is a privilege granted in consideration of specified levels of performance and of maintaining the established standards of scholarship and personal and professional conduct. The University reserves the right to require withdrawal at any time it deems necessary to safeguard its standards of scholarship, conduct, and orderly operation. The student concedes this right by act of matriculation. For additional information on withdrawing from the MSBS program, please see 'Student Initiated Changes in Enrollment Status' in the University Catalog, General Academic Policies and Procedures section.

Full-Time/Part-Time Status

All MSBS students enrolled in at least 10.00 credit hours are considered full-time students. Students enrolled in 7.50 – 9.99 credit hours are considered three-quarter-time students. Students enrolled in 5.00 – 6.59 credit hours are considered part-time students.

Time Limits

The Master of Science in Biomedical Sciences program is designed to be completed in two (2) years of full-time study. The requirements for the degree must be fulfilled within three (3) years from the date of matriculation to the program. Students who are unable to meet the three-year time limit for the MSBS program may be subject to administrative withdrawal.

Tuition and Fees

By action of the Board of Trustees, MSBS tuition and fees for the 2022/2023 academic year (subject to change) are as follows:

$867.00	Per Credit Hour

Other Fees and Expenses

$30.00	Late Registration Fee (Per Business Day)
$50.00	Late Payment Fee (per month)
$350.00	Graduation Fee
$470.00	Annual Parking Permit (Auto)
$40.00	Locker Key Replacement Charge
$10.00	Official Transcript (Each)
$21.00	Rush Transcript, First Class Mail (Each)
$25.00	Rush Transcript, Federal Express (Each)
$10.00	Student ID Replacement Fee

Financial Support

Financial support, which includes scholarships, is available to a small number of qualified applicants on a limited, competitive basis.

General Academic Policies and Procedures

Attendance and Participation

Students will come prepared and adhere to established times for classes, assessments, laboratories, rotations and meetings. Student attendance is required at all scheduled instructional periods. Absence from instructional periods for any reason does not relieve students from responsibility for the material covered during the periods missed. In order to receive an excused absence for instructional sessions, exams and assignments, it must be due to medical and emergency grounds and a TOR should be submitted and approved.

Three or more unexcused absences will be viewed as a violation of the Standards of Academic Integrity, Professionalism and Student Conduct, will be noted in the student's record, and may be grounds for a meeting with the Student Performance Committee (SPC). Consequences of this meeting may include placing the student on probation or suspension. If a student is reported as having arrived late to a class three times without an excuse, a note may be made in their record. Additionally, students with more than six unexcused tardies may be viewed in violation of the Standards of Academic Integrity, Professionalism and Student Conduct and may be called for a meeting with the SPC. Consequences of this meeting could include placing the student on probation or suspension.

Vacation

Students receive three weeks' vacation each year; two weeks over the Winter Break and one week for Spring Break. Students may not expect to take more time than this and may not leave early or return late from the break. Vacations are not provided during academic semesters.

Graduation Requirements

Obtaining the Master of Biomedical Sciences Degree will be based on cumulative GPA (minimum of 3.0), including the writing, presentation, and defense of a thesis. The Thesis Committee shall convene at least twice per year to ensure satisfactory progress is being made. MSBS candidates are required to present their thesis to their Thesis Committee for approval. In addition, students will be required to defend their dissertation during an oral presentation at the end of their program. The Thesis Committee consists of at least three faculty members (the faculty advisor plus two other faculty members). The Chair and at least one other member of the committee must be full-time faculty at Western University of Health Sciences. Upon satisfactorily passing all exams, students are to provide an electronic copy of their thesis to the Acting Dean..

Standards of Academic Integrity, Professionalism and Student Conduct

The University Standards of Academic Integrity, Professionalism, and Student Conduct can be located in the University Catalog. The standards outlined below are in addition to those outlined in the University Catalog. Students are expected to be aware of, and abide by, both University and applicable College policies.

GCBS Honor Code

Honesty and integrity are among the most valued traits of academic researchers and health care professionals. Each student is expected to assume personal responsibility for those traits. Academic dishonesty includes cheating, plagiarism, using unauthorized resources during examination(s), sabotaging other students and mentors' research and signing another person's name to an attendance or examination document. Matters of academic dishonesty and professional misconduct will be handled consistently with the University's guidelines for Hearings involving alleged violations of the standards of professional conduct as described in the University's General Academic Policies and Procedures. Any individual who witnesses or becomes aware of a possible violation of the Honor Code is bound to report the incident. Staff or students must report the incident to the Acting Dean.

Student Conduct Violations

Upon receipt of an allegation of misconduct, an ad hoc Student Performance Committee consisting of faculty who teach in the MSBS program or mentor MSBS thesis students will investigate the allegation and forward a recommendation on a course of appropriate action to the Acting Dean. Potential sanctions could include placing the student on probation; requiring the student to undertake specific remedial activities, suspension for a defined period of time, or dismissal from the program. Decisions of the Acting Dean may be appealed following the procedure outlined in the 'Student Appeal Process' section of the University Catalog.

Standards of Academic Progress

MSBS students must maintain a cumulative GPA of 3.00 or higher on a semester basis to be considered making satisfactory academic progress (SAP).

Student Performance Committee

The Student Performance Committee (SPC) is charged with the following responsibilities: (a) to review, at the end of each semester, the academic achievement and comprehensive evidence of progress of all students who are pursuing the MSBS degree; and (b) to receive reports from the Office of Academic and Student Affairs regarding any student whose professional or personal conduct is deemed unsatisfactory. Appropriate professional and personal conduct is defined by the University's and College's Standards of Academic Integrity, Professionalism and Student Conduct. At the time of the semester evaluation of each student by the SPC, if a student is found not to be meeting satisfactory academic progress because of failure to meet GPA requirements or time to degree limit is exceeded, the student may be subject to either dismissal or administrative withdrawal.

The Student Performance Committee is an ad hoc committee consisting of faculty who teach in the MSBS program and/or mentor MSBS students.

Graduation

A student will be recommended for the Master of Science in Biomedical Sciences degree provided that they:

1. Are not on probation or suspension and has completed all prescribed academic requirements with a cumulative grade point average of 3.00 or higher and they have no outstanding grade of "I" or "NCR," or "U." A 2.00 (C) grade earned in any class may be applied toward graduation only if the cumulative grade point average at the time of application for graduation continues at a minimum of 3.00 (B).

2. Have satisfactorily completed and orally defended a written thesis.

3. Have demonstrated no serious deficiencies in ethical, professional, or personal conduct as defined in the University Catalog, General Academic Policies and Procedures section, which would make it inappropriate to award the degree of Master of Science in Biomedical Sciences.

4. Have complied with all the legal and financial requirements of the University, as stated in the University Catalog.

5. Have attended and participated in the Commencement ceremony at which time the Master of Science in Biomedical Sciences degree is conferred. Unless special permission has been granted by the Acting Dean, each student must participate in his or her respective commencement ceremony. If the Acting Dean grants special permission for excusal from commencement, the graduate may be required to present themselves before the Acting Dean, or Acting Dean's designee, at another specified date before their diploma will be released. Requests for excusal will only be granted for extenuating circumstances, such as a prior military commitment, or death in the family.

Students may participate in commencement activities provided they will complete all requirements of the program by December 31 of that calendar year. No student will receive the degree until they have completed all requirements for graduation. Degrees will be dated as appropriate to completion date.

Adverse Actions

Probation

Students may be placed on Probation for the following reasons (these are in addition to the reasons listed in the Standards of Academic Progress section of the University Catalog).

1. Inadequate academic progress as determined by the Student Performance Committee. This includes, but is not limited to, receiving a "U" grade in any course.

2. A semester or cumulative grade point average below 3.00.

3. When directed to repeat a year for academic reasons.

4. Failure to perform in a professional manner.

5. Serious deficiencies in ethical or personal conduct.

A student placed on probation for receiving a grade of "U" or for a semester or cumulative GPA less than 3.00 in a given semester will be removed from probation after one semester, provided they have regained a cumulative GPA of at least 3.00 and/or have remediated the failed course. Students on probation are to remove themselves from all leadership roles in co-curricular activities associated with the University and/or with professional associations.

Financial Aid Warning Policy

If a student is not achieving satisfactory academic progress (SAP) they may be placed on "Financial Aid Warning" status for the next payment period and continue to receive Title IV aid for that period. Students who fail to make SAP by the end of that payment period lose Title IV aid eligibility.

It is the policy of the Financial Aid Office (FAO) that once a student has been placed on academic probation for not meeting SAP standards as defined by the college, the FAO will automatically place the student in a Financial Aid Warning status. During the next academic term if the student does not meet SAP standards and the college places the student on academic suspension, the student will no longer be eligible for financial aid. If the student appeals the academic suspension and the appeal is approved, financial aid will be reinstated. If the student is directed to audit courses those courses may not be covered by financial aid.

Tutorial Assistance Program

A Tutorial Assistance Program (TAP) has been established to assist students experiencing academic difficulty. Students will be recommended for this program by the Office of Academic and Student Affairs. Students may also self-identify to TAP to receive assistance. The tutors will be chosen on the recommendation of Office of the Acting Dean. Group tutoring is the methodology most used by the TAP department. For assistance, contact the Learning Enhancement and Academic Development Office (LEAD).

Remediation

Where deemed appropriate, the Student Performance Committee, after consultation with the Acting Dean (or Acting Dean's designee) may recommend any one of the following options:

1. Successful completion of a comprehensive examination.
2. Successful completion of a series of exams.

Recommendations regarding remediation will be made on an individual basis after considering all pertinent circumstances. The final decision will be made by the Acting Dean, based upon the recommendation of the SPC. Course remediation by exam(s) will take place during the summer following the year in which the student failed the course. All summer remediation exams will take place no sooner than June 1 and no later than August 1 of the following summer after the student has failed a course. Students who require remediation but are unavailable on the designated examination date will not be allowed to progress in the curriculum and will be placed on academic suspension. If repeating a course is recommended by the SPC, the Acting Dean will work with the course director to design an appropriate remediation assignment.

A student who is required to remediate a course must be notified in writing by the Acting Dean (or Acting Dean's designee) at least 15 working days prior to the remediation date, or within 15 working days after the close of the academic year in which the student is presently enrolled, whichever comes first. Notification must be acknowledged with the electronic signatures of the Acting Dean (or designee) and the student.

The score/grade achieved by remediation will be the score/grade recorded except that the highest score/grade a student may earn by options 1 or 2 (above) is a score/grade of "C." The grade achieved by remediation will be recorded on the transcript next to the original grade.

Academic Suspension

No student is eligible for Title IV HEA programs if they are placed on Academic Suspension. Students on Academic Suspension are not registered as an active matriculant and should use this time to remediate the deficiency for which the Academic Suspension was levied.

Dismissal

Students may be dismissed if they earn more than two failing grades ("U" or "NCR"). If the cumulative grade point average remains below 3.00 after the student completes a total of nine (9) graded credit hours subsequent to being placed on academic probation, the student may be dismissed from the program.

Students who receive a "U" grade for GCBS 6999 (Research and Portfolio and Internship) may be dismissed regardless of GPA or academic standing in the program.

Student Appeal Process

At the conclusion of each academic term, the Student Performance Committee will review whether students have met the established Standards of Academic Progress. Recommendations by the Student Performance Committee are advisory to the Acting Dean, who will make the final decision and issue the notification to the student.

In accordance with WesternU policy, the Acting Dean's decision may be appealed by the student to the SVP/Provost of Western University of Health Sciences. The decision of the SVP/Provost is final. For additional information, please see 'Student Appeal Process' section of the University Catalog.

Evaluation and Grading

Program Outcomes

Critical Thinking

The MSBS graduate will be able to identify and understand critical issues in biomedical sciences. They should possess the ability to challenge and evaluate information using evidence-based research principles, as well as synthesize and integrate knowledge in the discipline, leading to new ideas, approaches, and research.

Breadth and Depth of Knowledge

The MSBS graduate will understand the current and historical theories, concepts, and models of biomedical sciences. They should possess the ability to access and evaluate the literature of the discipline and understand the major issues in the current state of knowledge. They should also possess an ability to transcend traditional disciplinary boundaries and effectively conduct original, discovery- based or applied research in biomedical sciences under the direct guidance of a faculty member.

Interpersonal Skills

The MSBS graduate will possess the ability to write and speak about the current issues of biomedical sciences to peers, practitioners, and the public. They should be able to articulate and demonstrate knowledge of the discipline and write and present scholarship information to professionals.

Collaboration Skills

The MSBS graduate will be able to collaborate with other members of the research team, with colleagues (both within the discipline and across related disciplines), and if appropriate, with other communities of interest in the conduct of a research program.

Ethical and Moral Decision Making (Humanistic Skills)

The MSBS graduate will understand and exhibit the professional standards for responsible and ethical conduct of research in biomedical sciences.

Life-Long Learning

The MSBS student should be able to engage in life-long, self-directed learning to maintain and expand competence in the discipline, including staying abreast of current issues, methods, and approaches in biomedical sciences.

Evidence-Based Research

The MSBS student will have a solid grounding in the literature pertaining to a particular question and be able to understand and appropriately use the methods and techniques used for advancing knowledge in their field of study. They should be capable of designing, working within, and coordinating multi-disciplinary research programs.

Grading Scale

Final course grades are given based upon the traditional 4-point letter system, as follows:

Grade	Equivalent	Percentage	GPA Points
A	Outstanding	90 – 100%	4.00
A-	Excellent	87.5 – 89.9%	3.70
B+	Very Good	85 – 87.4%	3.30
B	Good	80 – 84.9%	3.00
B-	Above Average	77.5 – 79.9%	2.70
C+	Satisfactory	75 – 77.4%	2.30
C	Marginally Passing	70 – 74.9%	2.00
U	Unsatisfactory	<70%	0.00
CR	Credit		N/A
NCR	No Credit		N/A

Administrative Grades

Grade	Equivalent	GPA Points
AU	Audit	N/A
I	Incomplete	N/A
M	Missing	N/A
TR	Transfer	N/A
W	Withdrawal	N/A
WPC	Waived for Prior Credit	N/A

Audit

An “AU” (Audit) is assigned to a student who pays tuition for the course and attends class activities but does not complete examinations and does not receive course credit. However, under certain circumstances, at the discretion of the Acting Dean, a student who is repeating or undergoing remediation may be required to complete course examinations and/or other required work products while auditing the course for no grade.

Missing Grades

A grade of ‘M’ for Missing will be input by the Office of the Registrar if a student’s grade is not available by the deadline for grade submission. An ‘M’ grade is not included in the GPA calculation and will be replaced by the grade earned in the course once submitted by the course director/instructor. ‘M’ grades should not be used by the program in place of an Incomplete (I) grade.

Incomplete

An Incomplete grade ("I") will only be assigned to students whose professional commitments and/or personal responsibilities prevent him or her from completing the requirements of the course. A student may remove an incomplete by completing course requirements within the following six calendar months or the final grade will be permanently recorded as a “U.” This rule applies regardless of the student’s enrollment status. A student not enrolled during the following six months must still successfully remove the “I” grade. The instructor must certify any grade changes. The “I” grade will remain on the student’s transcript, along with the final grade assigned by the instructor.

Grade Reports

Official grades are turned in to the Registrar by the Office of Acting Dean , at which time the online student records system, Self-Service (BanWeb), is updated. Official grade reports and unofficial transcripts will be available on the Self-Service (BanWeb) student records system throughout the academic year.

Grade Appeals Process

If a student believes there is just cause to dispute a grade for a course, the procedure is as follows: Within five (5) days of receipt of the course grade, the student may request a review of the grade in writing to the Office of the Acting Dean.. The request must be accompanied by a narrative explaining the basis for the request. The narrative should fully explain the student's situation and substantiate the reason(s) for advocating a review of the prior decision. The Acting Dean may adjust the grade as appropriate.

Within five (5) days of receiving the grade, a student may appeal the grade to the Acting Dean. The Acting Dean will grant an appeal only if a claim of (1) bias, (2) the appearance of new material and documentable evidence that was not available at the time of the instructor's decision, or (3) procedural error that unfairly affected the decision-making process is substantiated. Within seven (7) working days, the Acting Dean shall issue a decision in writing to the student, which may affirm, modify, or reverse the previous action. The Acting Dean's decision is final in all course grade appeals.

Credit Hour Calculation

The Graduate College of Biomedical Sciences awards one credit hour for every 15 contact hours.

Curriculum Offerings

To obtain a Master of Science in Biomedical Science, students must complete a minimum of 40 credit hours, which includes 14 credit hours of Didactic Core Courses, and 26 credit hours of Research and Elective credits.

Didactic Core Courses

Fall, Year 1		
Subject/Course #	**Course Title**	**Credit Hours**
GCBS 5040	Molecular and Cellular Basis of Life	3.00
GCBS 5060	Introduction to Biotechnology	2.00
GCBS 5080	Biological Systems in Human and Animal Disease I	2.00
	Total Required Fall, Year 1 Credit Hours:	**7.00**
Spring, Year 1		
Subject/Course #	**Course Title**	**Credit Hours**
GCBS 5081	Biological Systems in Human and Animal Disease II	2.00
GCBS 5086	Bioinformatics	3.00
GBCS 5090	Biomedical Statistics and Research Design I	2.00
	Total Required Spring, Year 1 Credit Hours:	**7.00**
	Total Required Credit Hours:	**14.00**

Research Core Courses

Subject/Course #	Course Title	Credit Hours
GCBS 6000	Graduate Seminar	2.00
GCBS 6601	Special Research Experience	3.00
GCBS 6701	Directed Reading	3.00
GCBS 6999	Research and Thesis	8.00
	Total Required Credit Hours:	**16.00**

Elective Courses

Subject/Course #	Course Title	Credit Hours
GCBS 5051	Genetics	2.00
GCBS 6101	Advanced Topics in Immunology	2.00
GCBS 6501	Advanced Topics in Neurobiology	2.00
GCBS 6901	Clinical Research	4.00
	Total Required Elective Credit Hours:	**10.00**

Course Descriptions

All courses are awarded letter grades, except when indicated otherwise.

GCBS 5040 Molecular and Cellular Basis of Life (3.0 credit hours)
This course covers a wide range of topics in molecular and cellular basis of life. The goal of this course is to provide an integrative view of the general principles in molecular biology, biochemistry, cellular physiology, metabolism, and basic histology.

GCBS 5051 Genetics (2.0 credit hours)
The overall goal of this course is to reinforce to students the most important concepts and principles of genetics. Topics previously covered in earlier courses will be expanded and discussed in class. The key objective is to be able to apply concepts rather than merely memorizing information. Students will be applying these principles to real life examples and solving genetic problems.

GCBS 5060 Introduction to Biotechnology (2.0 credit hours)
This intense introductory course will provide theoretical knowledge, hands-on laboratory training, and practical computer bioinformatics skills necessary and sufficient to start practical work in biotechnology projects. This is a 16-week, 2-credit hour course (one lecture hour + one 3-hour lab session per week for 14 weeks, plus 2 weeks of assessment). In this course, the student will be trained in the basic principles and execution of laboratory techniques used in the biotechnology and R&D industries and in academic research. The topics may include recombinant DNA technologies, oligonucleotide synthesis, PCR, Gibson's assembly, mRNA, siRNA, cDNA, cloning, separation and analysis of DNA, in situ hybridization, DNA microchips and microarrays, bioinformatics tools, *in silico* sequence and macromolecular structure analysis, alignments, libraries, protein overexpression and purification, chromatography, electrophoresis, light scattering, spectroscopy, proteome and antibody microchips, structure based drug discovery, yeast-based technologies, stem cells, molecular imaging, animal models, drug delivery systems, and technology transfer. Hands-on experience in these techniques will be provided using equipment and protocols currently present in various WesternU laboratories. Students will be able to learn these techniques hands-on, troubleshoot procedures employing the techniques, and analyze and interpret experimental data obtained using these techniques.

GCBS 5080 Biological Systems in Human and Animal Disease I (2.0 credit hours)
The primary goal of this course is to provide an integrative view of the general principles in human and animal systems biology and related diseases, in the context of homeostasis and related phenomena. A secondary goal of this course is to foster student-centered learning skills and the confusing a variety of academic and scientific resources including textbooks, primary literature, review papers, scholarly online databases, and peer group discussions.

GCBS 5081 Biological Systems in Human and Animal Systems II (2.0 credit hours)
The Biological Systems in Human and Animal Disease II is a required course for students enrolled in the Master of Science in Biomedical Sciences. This course will sensitize students to the etiology, pathology, medical diagnostics and interventional modalities of important diseases or medical conditions that affect more than one physiological system. The goal of the course is to provide students with both a translational and humanistic perspective to diseases that currently have a large burden on our human societies.

GCBS 5086 Bioinformatics I (3.0 credit hours)
Participants in the course will develop proficiency in the application of bioinformatics in research through a variety of activities including: (1) in-class discussions of selected published papers; (2) hands-on

experience using powerful, freely-available, bioinformatics resources; (3) working through material in course material and papers; (4) practice developing reasonable comparative genomics hypotheses; (5) practice designing and executing comparative genomics experiments to test hypotheses; (6) opportunities to interpret bioinformatics results in the context of specific hypotheses.

GCBS 5090 Biomedical Statistics and Research I (2.0 credit hours)
This course will introduce students to the key concepts in descriptive and inferential statistics required for the successful independent analysis of large clinical and/or biological datasets. Various topics will include central tendency, variability, statistical power, hypothesis testing, conditional probability, correlation analysis, analysis of variance, and regression analysis. An important goal of this class is to transform the student into a competent and proficient statistician who can carry out a detailed statistical analysis of real-world data and explain the analysis and its significance to others. In order to achieve this goal, the course will be taught in a manner that facilitates student-centered learning and requires students to work together to learn, explain and communicative statistical concepts. Students will learn to identify, understand, discuss, and evaluate the statistical methods and findings presented in published research papers. Students will apply their knowledge of statistics to problem sets and projects throughout the course. Because the application of statistics requires access to powerful and scalable statistical software, this course requires students to become proficient with the freely available software package R, which is widely used in applications ranging from clinical trials to genomic analysis. Students who successfully complete this class will be able to apply statistical reasoning and methods to specific research questions and projects.

GCBS 6000 Graduate Seminar (1.0 credit hour)
This course exposes graduate students to high-caliber basic and applied research through campus wide research seminar series, sponsored by many colleges on the Pomona campus. Students are assigned reading material related to the seminar topic and engage in an informal discussion of the topic, led by a faculty member, before attending the seminar. . Students may also have opportunities to interact with guest speakers in informal settings before or after the seminars. Repeatable up to the required total of two credit hours in 1-unit increments.

GCBS 6101 Advanced Topics in Immunology (2.0 credit hours)
As a comprehensive elective course in immunology, the topics covered here include a broad but intensive examination of the cells and molecules of the immune system. Special attention is given to the experimental approaches that led to the modern principles of immunology. Examination of the regulatory interactions among different components of the immune system and the deleterious effects of aberrant immune processes will occur. Relevant and recent primary literature articles will be introduced for reading, summary, and subsequent group discussion.

GCBS 6501 Advanced Topics in Neurobiology (2.0 credit hours)
This elective course covers a broad and extensive range of topics in advanced neurobiology and is designed to give the student a more thorough understanding of neuronal function. In keeping with one of the original and basic programmatic tenets of the GCBS curriculum, learning will be student oriented and driven.

GCBS 6601 Special Research Experience (1.0 – 3.0 credit hours)
Assigned laboratory experiences, either on or off-campus, introducing students to the research techniques and protocols under the guidance of a faculty member at Western University of Health Sciences.

GCBS 6701 Directed Reading (1.0 – 3.0 credit hours)
This course is an independent study course consisting of individualized readings in various topics in the biomedical sciences. Directed readings allow detailed study of topics pertinent to research encountered in laboratory rotations or subjects that are not otherwise addressed in the MSBS curriculum. The student will be expected to work with an instructor to develop a reading list and to define course objectives.

GCBS 6901 Clinical Research (4.0 credit hours)
This course will cover detailed practical instruction on how to design cross-sectional, cohort, and case-control studies. We will focus on determining the required sample size to achieve a statistical power of 0.8 (or greater) for different study design. Energy will be spent on designing randomized blinded trials (either single blinded or double blinded). We will also deal with enhancing casual inference in observational studies. Ethical issues, surveys, data management will be covered in the course as well. Prerequisite: Knowledge of biostatistics and some concept of epidemiology or approval from the course instructor.

GCBS 6999 Research and Thesis (1.0 – 8.0 credit hours, CR/NCR)
Completion of a thesis is a requirement for the Master of Science in Biomedical Sciences degree program. The thesis will be based on a research project that the student works on during their enrollment in the MSBS program. The faculty advisor (thesis advisor) will help the student select a topic and mentor the student in his/her progress. Students are expected to prepare a thesis proposal, attend regular meetings with his/her thesis/faculty advisor and other thesis committee members. Submission and oral defense of the written thesis is required to complete the program. The last part of the thesis defense includes a comprehensive examination. Repeatable to a maximum of 8 credit hours.

Honors and Awards

The following awards are considered for presentation to MSBS students annually:

Deans' List
East-West Scholarship
Who's Who Among Students in American Colleges and Universities

Academic Calendar

Fall 2022	
August 8, 2022	Fall Classes Begin
September 5, 2022	Labor Day – No Classes
November 11, 2022	Veterans Day – No Classes
November 23, 2022	Thanksgiving Recess Begins @ 5:00 p.m.
November 28, 2022	Fall Classes Resume
December 09, 2022	Fall Classes End
December 10, 2022	Winter Recess Begins
Spring 2023	
January 3, 2023	Spring Classes Begin
January 16, 2023	Martin Luther King Day – No Classes
February 20, 2023	President's Day – No Classes
March 20, 2023	Spring Break Begins
March 27 , 2023	Spring Classes Resume
May 8, 2023	Spring Classes End
May 17, 2023	MSBS Commencement Ceremony