METROPOLITAN STATE UNIVERSITY OF DENVER

Curriculum, Academic Effectiveness, and Policy Development

2025-2026 Catalog Addendum

Academic Affairs

Friday, July 11, 2025

2025-2026 Undergraduate Catalog
2025-2026 Graduate Catalog

This catalog addendum contains new and revised academic programs and policies. Information in this addendum is subject to change. For general University information, visit MSU Denver's website, msudenver.edu.

Academic Policies and Procedures (Graduate Catalog)

Duplicative Coursework

~~A graduate program~~ Undergraduate programs may choose ~~not to include~~ to allow or not allow credits ~~counted~~ earned in ~~an undergraduate~~ a graduate program to count toward an undergraduate degree. Approval must be granted by the graduate program for credits to count toward both undergraduate and graduate degrees. ~~If they so choose, then a~~ A maximum of 32% ~~percent~~ of ~~graduate level credits from the~~ credits applied toward a master's degree may ~~count~~ be counted toward the completion of both the graduate and undergraduate programs. ~~for both bachelor and master programs. Approval must be granted by the graduate program.~~

Combined Undergraduate/Graduate (CUG) Programs

Combined undergraduate and graduate (CUG) degree programs, often referred to as 3+2 or 4+1, can provide substantial time and financial advantages to some undergraduate students. With the permission of the program directors of the undergraduate major and the graduate program, the student enrolls in the selected CUG program. The undergraduate student registers for specified graduate courses, on which the undergraduate *major* program and the graduate program agreed in the CUG program proposal. This agreement is important to document that the graduate courses will count towards the undergraduate degree requirements; only after documentation will the student be able to obtain undergraduate financial aid also for these graduate courses. Approved graduate courses will be counted twice, both toward the undergraduate degree and the graduate degree. Some discipline-specific accreditation requirements do not allow the substitution of graduate credits for a specified number of undergraduate credits; see program-specific information for details, if restrictions apply.

Combined Graduate/Undergraduate Program Policies:

- A maximum of 32% percent of credits applied toward a master's degree may count toward the completion of both the graduate and undergraduate programs.
- The required credits for graduation in a MSU Denver Graduate Program vary between 30 and 69 credits, and the minimum required credits for graduation are often set by the discipline specific accreditation agency.
- It is the prerogative of the undergraduate and graduate program to decide if *any* or no graduate courses can be double counted for both program levels.
- Graduate programs decide on the pre-requirements that the undergraduate student will have to fulfill to become eligible for enrollment in the graduate courses of a CUG program.
- Students who are declared in a CUG program and whose status has been switched from undergraduate to graduate student but who still need to enroll in undergraduate courses will be allowed to have priority registration according to their undergraduate credit qualifications.
- The Department of Education requires that a student have completed at least 72 credit hours before starting a graduate program. To assure an undergraduate student's success in a CUG program, it is suggested that the undergraduate student holds a minimum undergraduate GPA of at least 3.0 at the time of admission to the CUG program. Graduate programs may also require a higher undergraduate GPA for such students.

Financial Aid Policies and Considerations for CUG Programs:

- To remain eligible for undergraduate Financial Aid, students enrolled in a CUG program should be enrolled for *at least* six (6) undergraduate credits that count towards the student's undergraduate degree.
- A student may receive undergraduate financial aid for graduate level courses that will count towards the undergraduate degree. If an undergraduate student has a combination of graduate and undergraduate courses, a student will only be eligible for financial aid for the courses that count towards the undergraduate degree requirements.

- Once CUG students have earned the maximally allowed graduate credits while being registered as undergraduate students, the graduate program will notify MSU Denver Graduate Studies that the student's account in the Student Information System should be switched from undergraduate to graduate student status.

- Once the student account has been switched to graduate, the student will *not* be eligible for undergraduate financial aid, which includes most grants. A graduate student typically only qualifies for graduate-level student loans.

- For some disciplines, especially those that require practica/internships outside the university, it is important that the BS/BA is awarded on the way to the master's degree, while other programs might prefer to award the bachelor's and master's degree at the same time.

- For CUG students who are enrolled in a CUG program that awards the BS/BA degree *at the same* time as the Master's degree is awarded, the student status in the Student Information System will, just as for all CUG students, be changed from undergraduate to graduate once the maximal number of double-counted credits have been earned.

GPA Requirements

The minimum passing grade for all graduate courses is a "C-" (C minus) and no more than two "C" level grades (C-, C, C+) may count towards graduation. Individual graduate programs might use higher grades as the minimum passing course grade. In all cases, students must make sure that low passing grades are compensated with stronger grades so that the minimum required ~~cumulative~~ program GPA of 3.0 or higher (dependent on the specific graduate program) can be reached for graduation.

Master of Arts in Teaching GPA Requirements

Students in the MAT program must complete the degree with a GPA of 3.0. No more than two grades of "C" will count toward degree requirements, and no grade lower than "C" will count toward the degree. All grade records remain on the master's transcript and all program-related course work counts toward the program GPA. A student who has received two grades of "C" will be placed on probation and required to meet with an advisor on a regular basis. A student who receives a third grade of "C" will be dismissed from the program.

Master of Professional Accountancy GPA Requirements

Students in the MPAcc program must complete the degree with a program GPA of 3.0. No more than two grades of "C-," "C," or "C+" will count toward degree requirements, and no grade lower than a "C-" will count toward the degree. All grade records remain on the master's transcript and all program-related course work will count toward the program GPA. A student who receives three grades of less than a "B-" will be suspended from the program for one academic semester. Upon return from suspension, subsequent grades below a "B-" will result in program dismissal.

Academic Suspension and Dismissal Appeal Process for the MPAcc Program

Student are notified of suspension or dismissal in writing after end of term grades are reviewed. In cases of suspension, appeal deadlines will be provided in the notification. Late or incomplete appeals will not be processed. Appeals can be sent to the department chair or MPAcc graduate program coordinator. If an appeal is not received within two semesters after the dismissal, the student will need to reapply to the University. Students are not allowed to enroll in courses until a decision is made.

The program Graduate Committee reviews all appeals. They may grant, deny, or conditionally grant an appeal. Conditions may include but are not limited to course, grade, and advising requirements. Students failing to meet the committee's conditions will be dismissed from the program.

The department will notify students in writing of the appeal decision and any imposed criteria or limitations. The student must agree to any imposed criteria or limitations in writing before enrolling in any courses. Any student who has not been enrolled for three consecutive semesters, including summer, must reapply to the University. All appeal decisions are final.

Master of Social Work GPA Requirements

MSW students must maintain a program GPA of 3.0 in any academic term. Any student falling below a program 3.0 in any given term will be placed on academic probation and be required to develop a plan for raising the program GPA above 3.0. Students who fail to raise their program GPA over 3.0 after 15 units will be dismissed from the program. No grade lower than a "B-" counts toward MSW degree completion. Students receiving a "C+" or below will be required to repeat the course. Students must be aware that the sequential coursework policy will often require students to take time off to repeat the course work. Students who do not successfully complete a social work course with a "B-" or better after the second attempt will be dismissed from the program.

Academic Records (Graduate Catalog)

How to Calculate Your Grade-Point Average (GPA)

The number of quality points awarded for a course is determined by multiplying the number of semester hours for that course by the quality point value of the grade received. The ~~cumulative~~ program GPA is calculated by dividing the total number of quality points earned in completed program courses by the number of semester hours attempted.

To be eligible for a degree, a candidate must have earned a minimum number of program-defined quality points ~~equal to twice the number of semester hours attempted~~ in addition to meeting other prescribed requirements. The following notations have no effect on the GPA: AW, I, IP, NR, W.

Departments/programs may, at their discretion use the plus/minus system but are not required to do so. Instructors are required to notify students of the grading system used for an individual course via the course syllabus. Special symbols are indications of registration or grade status and are not assigned by the instructor.

Financial Aid and Scholarships (Graduate Catalog)

Unofficial Withdrawals

The University verifies attendance for any student who unofficially withdraws or receives all F grades for a term. If attendance cannot be verified, students will be required to immediately repay all financial aid received for that term. Satisfactory Academic Progress Review

Students applying for or receiving financial aid must meet satisfactory academic progress standards at the University. These requirements are reviewed at the end of each semester once the semester's grades are made official. Your academic progress is considered satisfactory if you:

- maintain a minimum ~~comprehensive~~ program GPA consistent with the University requirement~~s. The University requires all graduate students to maintain a minimum cumulative GPA of 3.0. Programs may have more stringent requirements.~~ and any program requirements, which may be higher.
- ~~pass 75% of all credit hours attempted while enrolled as a graduate student at the University.~~
- complete your degree requirements within the maximum time allowed.

The University reviews financial aid files at the end of each term. If you are not making satisfactory academic progress or do not meet the semester completion requirements, you will be ineligible for financial aid until you are once again making satisfactory academic progress.

Graduate Academic Regulations (Graduate Catalog)

Academic Performance

~~A fundamental requirement for satisfactory academic performance is that, with very limited exceptions, students with a cumulative grade point average (GPA) below 3.00 are ineligible for graduation from a graduate degree or certificate program. Students with a cumulative GPA that drops below 3.00 at any time should consult with their advisory or Graduate Program Coordinator for advice and possible options.~~

A fundamental requirement for satisfactory academic performance is that graduate students earn a program GPA of 3.00 or higher (if the program requires a GPA higher than 3.0 for graduation). Students with a cumulative GPA below the program required minimum or 3.0 at any time should consult with their Graduate Program Coordinator for advice and possible options.

~~Cumulative GPA Requirement~~ All students admitted to MSU Denver Graduate ~~Studies~~ Programs, including degree and ~~certificate students and~~ nondegree-seeking students, must meet the ~~cumulative~~ GPA requirements described in this section. A student admitted to a MSU Denver Graduate ~~Studies~~ Program must maintain a minimum cumulative GPA of 3.00, including transfer courses. Some graduate programs might require a GPA higher than 3.0 for graduation. If the ~~cumulative~~ program GPA is below 3.00 at the end of an enrolled semester (including summer), the student is placed on probation. At the end of the next enrolled semester (including summer), ~~MSU Denver Graduate Studies~~ the graduate program reviews the student's progress and takes one of the following actions:

1. Remove the student from probation if the cumulative GPA is 3.00 or above.
2. Continue the student on probation if the cumulative GPA is below 3.00 and the semester GPA is 3.00 or above. Students may continue on probation for an unlimited number of semesters but will be ineligible for graduation if their ~~cumulative~~ program GPA is below 3.00 at the end of the~~ir graduation~~ semester. Students should consult with their ~~advisor or the~~ Graduate Program Coordinators or Graduate Program Directors for advice and possible options.
3. May dismiss the student from their graduate program ~~and Metropolitan State University of Denver~~ if the ~~cumulative~~ program GPA is below 3.00 and the semester GPA is below 3.00, depending on program requirements. Students who are dismissed are administratively withdrawn from their courses and cannot register for classes until they are ~~either~~ reinstated to the graduate program ~~or readmitted to MSU Denver Graduate Studies~~. Students who request reinstatement and are granted reinstatement to the program within 30 calendar days are not required to reapply to ~~MSU Denver Graduate Studies~~ the graduate program. A new online application and application fee is required after 30 days, or when a student's request for reinstatement is denied.

In each case, ~~MSU Denver Graduate Studies~~ the graduate program informs the graduate ~~program~~ student via e-mail. The graduate student works through this process with the guidance of a graduate program representative.

Academic Performance at Graduation

All students enrolled in a graduate degree or graduate certificate program must meet the following academic performance requirements at the end of their final (graduation) semester: (1) ~~cumulative GPA requirement, (2)~~ program GPA requirement, and ~~(3)~~ (2) individual course requirements. Failure to meet these requirements will, at minimum, result in the postponement of graduation and may result in dismissal from the program. The authority to make a determination rests with the graduate program.

Postponement offers students an opportunity to improve their academic performance to meet minimum graduation standards. When postponement of graduation is offered, students must consult with graduate program ~~officals~~ officials to establish a plan for improved academic performance and graduation.

Students who are dismissed from a graduate program may appeal their dismissal only if ~~both of the following conditions are met:~~

- ~~The student changed graduate programs after their initial admission to MSU Denver Graduate Studies.~~
- The student's ~~semester~~ program GPA was 3.00 or above in ~~all semesters (including summers) after their change of graduate programs~~ the last semester.

~~In each case, the~~ The appeal will be ~~carefully~~ reviewed by ~~MSU Denver Graduate Studies and the timeliness of the appeal will be considered.~~ the graduate program and possibly other units inside the college. If agreement cannot be reached the appeal will be decided by the Grade Appeals Committee.

Program GPA Requirement

The program grade point average (program GPA) is the grade point average computed for this set of courses. If the program GPA is less than 3.00, the student is ineligible for the degree or certificate and should consult their advisor or the Graduate ~~p~~Program ~~d~~Director for advice and possible options.

Alternative Credit Options/Prior Learning Assessment (Undergraduate Catalog)

The university may grant credit for prior learning, depending on the academic program, as verified by the following assessment methods:

1. National standardized tests, including:
    - Advanced Placement Examinations (AP)
    - College-Level Examination Program (CLEP)
    - DSST/DANTES
    - International Baccalaureate (IB)
2. Departmental Credit by Examination
3. Portfolio Assessment
4. Credit for Military Training, Military Occupational Specialties, and Other Training Programs Evaluated by the American Council on Education (ACE)
5. Credit for Industry Licenses/Certificates

MSU Denver accepts transfer courses awarded through Prior Learning Assessment (PLA) from other accredited Colorado institutions. All PLA assessments exceeding the requirements of the Colorado GT Pathways policy are accepted without further assessment at MSU Denver.

Transfer credit awarded for PLA remains subject to MSU Denver's official transfer credit evaluation guidelines. PLA awards are subject to the same transferability guidelines as if the full course were taken at the sending institution. Courses that MSU Denver has determined are not transferrable to MSU Denver are also not transferrable as PLA credit.

PLA credit awarded for transcripted standardized exams (AP/IB/CLEP) will require official transcripts to be sent to MSU Denver for credit evaluation.

Prior learning credit does not count toward semester hour residency requirements. Regardless of credit granted for prior learning, all students must complete the minimum semester hour residency requirements. Therefore, the maximum number of prior learning credit hours is limited by these residency requirements. Please review the semester hour residency requirements before planning to use any of these options. See Degree and Certificate Requirements.

Each academic department determines the applicability of prior learning assessment to courses in the academic discipline and for the academic major and minor. Students must meet with an academic advisor in their program as well as with the Assistant Registrar~~, Prior Learning Assessment~~ responsible for alternative credit assessment to determine how much, if any, credit for prior learning may apply to a particular degree program. ~~The academic department in which the course in question resides will make the final determination on any credit granted for prior learning.~~

Academic departments may elect to defer responsibility for alternative credit requests to the Assistant Registrar. Departments that do not defer this responsibility will have alternative credit requests forwarded to the appropriate department representative. The Assistant Registrar and/or department representative will evaluate alternative credit requests based on current course titles, descriptions, and learning outcomes on file at the university, as well as any program or accreditation/licensure requirements.

When credit is granted by the Assistant Registrar, they will notify the relevant academic department representatives.

When credit is not granted, the student may appeal the decision to the academic department(s) in which the course or courses reside. The decision of the academic department on those appeals will be final. As needed, departments/programs are encouraged to develop memorandums of understanding with Registrar's Office about how to address frequent, complex, or contentious alternative credit requests.

Once prior learning is assessed and credit is awarded, the total number of those credits applicable to a degree will not be reduced unless the student repeats already-awarded credit at MSU Denver or interrupts MSU Denver enrollment for three or more consecutive semesters and readmits to the university under more restrictive Prior Learning Assessment evaluation policies.

For advising assistance with CLEP examinations, departmental credit by examination, and portfolio assessment, students may contact the Assistant Registrar, Prior Learning Assessment, Registrar's Office, Student Success Building Counter 3 (890 Auraria Parkway Suite 160), 303-605-5574

Degree and Certificate Requirements (Undergraduate Catalog)

Requirements for All Bachelor Degrees

To earn a Bachelor of Science, Bachelor of Arts, Bachelor of Music Education, Bachelor of Music, or Bachelor of Fine Arts degree, a student must satisfy the following minimum requirements, plus any others stipulated for the degree for which a student is a candidate. Please refer to the Academic Policies and Procedures in this catalog.

- Complete a minimum of 120 semester hours with a cumulative GPA of 2.0 or higher for all coursework.
- Complete at least 39 semester hours in upper-division courses (3000- and 4000-level courses).
- Complete all General Studies requirements listed for the degree ~~and major~~.
- Complete a three-credit hour Ethnic Studies & Social Justice course requirement.
- Complete a three-credit hour Senior Experience course requirement. This course must be taken at MSU Denver.
- Complete one subject major consisting of not less than 30 semester hours.
- Students may not major and minor in the same discipline and are encouraged to obtain verification from an advisor if uncertainty exists.
- Complete all requirements of the student's department, school, or college.
- Complete at least 33 semester hours outside of the major's most recurrent prefix.
- Achieve a cumulative GPA of 2.0 or higher in all MSU Denver courses that satisfy the requirements for the major and for all MSU Denver courses that satisfy requirements for a minor. Students should check with an advisor for special GPA program requirements.
- File an application for graduation through the Student Hub with the Office of the Registrar according to published dates in the Academic Calendar.
- Academic residency (classroom credit) requirements:
    - Complete a minimum of 30 semester hours of academic credit applicable to the degree at MSU Denver.
    - Complete at least 8 upper-division (3000- and 4000-level courses) semester hours of the major.

Requirements for Concurrent Degrees

Students must comply with the following to be awarded two diplomas for two concurrent baccalaureate degrees of different types (e.g., B.S. and B.M.E.):

- Declaration of concurrent degrees requires department approval(s) and must be made prior to completion of 90 hours. Both degrees must utilize the same catalog year.

- Students who declare two degrees do not need to complete a minor unless the minor is specifically required for either of the majors.
- Students must satisfy all requirements for both majors.
- Students must complete a minimum requirement of eight unique MSU Denver upper-division semester hours for each major.
- Students must complete a minimum requirement of 30 MSU Denver semester hours.
- Students must complete a minimum upper division requirement of 39 hours total.
- Students must complete university requirements for General Studies~~, including General Studies courses specific to each major~~.
- Students must satisfy only one Ethnic Studies & Social Justice Course requirement.
- Students must complete two unique Senior Experience courses.

Requirements for Dual Majors

Students must comply with the following to be awarded one diploma for a single baccalaureate degree with dual majors (B.A., B.F.A., B.M., B.M.E., or B.S.). See advisors in each of the majors for specific degree requirements.

- Students who declare dual majors must select a primary major. A primary major is the major for which General Studies requirements will be satisfied ~~(students who declare dual majors need not satisfy General Studies requirements for their second major)~~.
- ~~Students who declare dual majors do not need to complete a minor unless the minor is specifically required for either of the majors.~~
- Students who complete two concentrations under one major have not completed two majors.

General Studies Requirements (Undergraduate Catalog)

Written Communication Requirement

Description: Written communication is the development and expression of ideas in writing across many genres and styles. It includes understanding how writers may shape texts for their specific rhetorical situation. It includes multimodal composing and the creation of texts that combine words, images, and/or data. Written communication abilities develop through interactive and iterative experiences across the curriculum.

Students must complete a minimum of 6 semester hours to satisfy the written communication requirement.

Student Learning Outcomes

- Exhibit a thorough understanding of audience, purpose, genre, and context that is responsive to the situation.
- Create and develop ideas within the context of the situation and the assigned task(s).
- Apply formal and informal conventions of writing, including organization, content, presentation, formatting, and stylistic choices, in particular forms and/or fields.
- Critically read, evaluate, apply, and synthesize evidence and/or sources in support of a claim.
- Use an appropriate documentation system.
- Demonstrate proficiency with conventions, including spellings, grammar, mechanics, and word choice appropriate to the writing task.

Rules

1. Students must complete a placement to assess their writing skills. Placement may be in ENG 1008 and ENG 1009, ENG 1010 with ENG 1001, or ENG 1010.

2. Students shall satisfy the Written Communication course requirement and credit will be granted if they:
    a. pass 6 hours of approved Written Communication courses with a combination of a CO1 and CO2 or a CO2 and a CO3,
    b. pass a CLEP or AP test approved by a Department offering an approved Written Communication course and the remaining Written Communication course, or
    c. transfer equivalent courses.
3. To receive credit for Written Communication, the student must receive a grade of "C-" or better in each course.
4. ~~To receive transfer credit for ENG 1020, the course must have been taken within the past 10 years.~~

Registration and Records (Undergraduate Catalog)

Legitimate Academic Interest to Attend a Course

To attend a class, students must have a legitimate academic interest (e.g., be officially registered, waitlisted, auditing a course, ~~enrolled through CU Denver pooled program,~~ etc.). Individuals may not attend a class if they do not have a legitimate academic interest. Officially registered means that students have been accepted for admission by the university, and that the Course Reference Number (CRN) for the class is entered on the student's registration record. The deadline to register for a full-semester class is the census date, specified on the Academic Calendar. There are pro-rated deadlines for all other courses outside of the full-term courses. Undergraduate students who qualify for the College Opportunity Fund (COF) and register after the census date will not be eligible to receive the COF stipend.

Student Rights and Responsibilities (Undergraduate and Graduate Catalogs)

Academic Rights

Students have the right to:

- Be informed of course expectations and requirements.
- Be evaluated fairly on the basis of academic performance.
- Participate in free and open discussion, inquiry, and expression, both in the classroom and in conference.
- Receive competent instruction and advisement.
- Expect protection against professors' improper disclosure of students' personal information, views, beliefs, and political associations when such information has become known as a result of professors' instructions, advisement, or counsel.
- Expect protection, through established procedures, against prejudicial or capricious evaluation.
- Assess the value of a course to make suggestions as to its direction and to evaluate both the instructor and the instruction they have received.
- Have input in university policy-making, which may include, but shall not be limited to, course scheduling distribution of night and day classes, calendar arrangements, library policy and development, grading systems, course development, and curriculum.
- Expect instructors to conduct themselves professionally in the classroom in accordance with university policies and directives.
- Expect instructors to maintain office hours as required by university policy.
- Expect reasonable academic assistance from the appropriate department.
- Be informed of academic standards ~~expected of them in the classroom through a syllabus and/ or course outline. Academic standards shall include, but not be limited to, classroom civility, class attendance requirements, objectives to be achieved, and the grading criteria that will be applied to a particular course of study.~~ for the courses in which they are enrolled. Except when exempted by university policy, each for-credit academic course's learning management system (LMS) materials will include the following items or external links to them: a syllabus, an explanation of how

final course grades are determined (e.g., a course grading policy), and access to records of completed evaluations (e.g., points in a gradebook or feedback on student progress).

- Have every reasonable effort made to ensure course and instructional materials are as accessible as possible to all.

College of Aerospace, Computing, Engineering, and Design

Program Modification

Advanced Manufacturing Sciences Institute

Location: Aerospace and Engineering Sciences Building, Suite 300

Phone: 303-615-0880

E-Mail: amsi@msudenver.edu

Website: Advanced Manufacturing Sciences Institute Website

Advanced Manufacturing Sciences Major, B.S.

Advanced Manufacturing Sciences Institute

College of Aerospace, Computing, Engineering, and Design

Available Program Format(s): In-Person

About the Program

The Advanced Manufacturing Sciences Institute is at the forefront of a revolution in America's manufacturing economy - the use of smarter, leaner factories to develop and produce innovative new products, materials, and techniques. This multi-disciplinary degree will prepare students for leading-edge careers in the Advanced Manufacturing sector.

The Advanced Manufacturing Sciences (AMS) baccalaureate degree is a multi-disciplinary major that emphasizes both theoretical and practical applications, providing students with a solid foundation in core skills, knowledge and dispositions to facilitate expertise in advanced manufacturing professional positions.

The major requires a core set of courses and selection of a concentration so that each concentration becomes an extended major. The AMS bachelor's degree is accredited through the Higher Learning Commission.

Core Courses

The core of the AMS program is comprised of a set of courses that are integral to the goal of preparing students as manufacturing professionals in a variety of industry sectors. The required core courses are designed to provide students with a targeted skill set based on the following core competencies: subtractive manufacturing skills (CNC machining & inspection), additive manufacturing skills (including an opportunity to receive a Stratasys Certification), computer-aided design skills, quality assurance skills, soft skills including critical thinking, problem solving, teamwork, leadership and communication, math skills, computer skills including manufacturing data protection, technical writing skills, and basic electronics skills.

Concentration Courses

The student will choose a concentration in which to specialize:

- Aerospace Concentration
- Industrial Design Concentration

- Mechanical Engineering Technology Concentration
- Operations Management Concentration

Student Outcomes

Technical Skills

- Design - Apply scientific, mathematical, and technological knowledge and skills to effectively solve manufacturing problems.
- Processes - Analyze and interpret results of standard tests and measurements to improve manufacturing processes.
- Materials - Analyze and interpret results of standard tests and measurements to select manufacturing materials.
- Equipment & Tools - Implement proper and safe use of manufacturing equipment and tools.

Soft Skills

- Communication - Demonstrate effective written, oral, and graphical communication in both technical and non-technical environments.
- Critical Thinking - Analyze and evaluate information gathered by observation, experience, and reasoning and integrate and apply to inform decisions and actions.
- Teamwork - Demonstrate the ability to function effectively on a team whose members together provide leadership, create a collaborative and inclusive environment, establish goals, plan tasks, and meet objectives.

General Degree Requirements

To earn a degree, students must satisfy all requirements in each of the four areas below, in addition to their individual major requirements.

- Degree and Certificate Requirements
- General Studies Requirements
- Ethnic Studies & Social Justice Graduation Requirement
- Senior Experience Graduation Requirements

Program Requirements

- A total of 120 semester hours are required for graduation.
- A grade of C- or better is required for Core and Concentration courses that are not MET courses; all MET courses require a C or better. Students should note that programs differ in the minimum grade required.
- Students must achieve a minimum GPA of 2.5 within the major.
- Each student is required to complete an appropriate internship related to the degree program.

General Studies Requirements: 33 credits

Students should consult the General Studies Requirements for a list of courses that fulfill the General Studies Requirements for degree completion.

- Written Communication (6 credits)
    - **Recommended:** ENG 1010 - Composing Arguments and ENG 1020 - Research and Argument Writing
- Oral Communication (3 credits)
- Quantitative Literacy (3 credits)

    - **Recommended:** MTH 1109 - College Algebra Stretch, Part II or MTH 1110 - College Algebra for Calculus or higher
- Arts and Humanities (6 credits)
- Historical (3 credits)
- Natural and Physical Sciences (6 credits)
    - **Recommended:** MET 1040 - Introduction to Engineering, PHY 1000 - Physics of Nature, PHY 2010 - College Physics I, PHY 2030 - College Physics I Laboratory
- Social and Behavioral Sciences (6 credits)
    - **Recommended:** CET 3120 - Engineering Economy
- Global Diversity (0 or 3 credits**)

*** Students will fulfill the global diversity requirement by taking an approved course within one of the following categories: arts and humanities; historical; natural and physical sciences; or social and behavioral sciences.*

Ethnic Studies & Social Justice Requirement: 0 or 3 credits

- Students should consult the Ethnic Studies & Social Justice Graduation Requirement for a list of courses that fulfill the ESSJ Requirement for degree completion.
- Many programs include courses that meet this requirement. Students should consult with their advisor to determine what program courses may fulfill this requirement.

AMS Core Courses: 44 credits

- AMS 1010 - Survey of Advanced Manufacturing and Workplace Preparation **Credits:** 3
- AMS 3010 - Additive Manufacturing Stratasys Certification Preparation **Credits:** 3
- CS 1030 - Computer Science Principles **Credits:** 4
- CSS 2751 - Principles of Cybersecurity **Credits:** 3
- CSS 3753 - Computing and Security for Manufacturing **Credits:** 3
- ELE 1001 - Introduction to Electrical Engineering **Credits:** 3

- IND 1450 - Technical Drawing and CAD **Credits:** 3
  or
- CET 1215 - Civil Engineering Graphics **Credits:** 3
  or
- MET 1200 - Technical Drawing I **Credits:** 3

- JMP 2610 - Introduction to Technical Writing **Credits:** 3

- MET 1010 - Manufacturing Processes **Credits:** 3
  or
- IND 2830 - Manufacturing Materials and Processes **Credits:** 3

- MET 1310 - Principles of Quality Assurance **Credits:** 3
- MET 2010 - CNC Machining and Inspection **Credits:** 3
- MET 3000 - Manufacturing Analysis **Credits:** 4
- MET 3630 - Lean Manufacturing Systems Engineering **Credits:** 3
- MTH 1120 - College Trigonometry **Credits:** 3

Aerospace Concentration: 27 credits

Introduces students to aerospace operations and prepares them to contribute to the assembly, integration and test of air and spacecraft that make our lives on earth better.

- AES 1050 - Introduction to Space **Credits:** 3
- AES 2607 - Introduction to Aerospace Systems Simulation **Credits:** 3
- AES 3530 - Aerodynamics **Credits:** 3
- AES 3600 - Space Flight Operations I **Credits:** 3
- AES 3610 - Elements of Spacecraft Design I **Credits:** 3
- AES 3850 - Human Factors and Physiology of Flight **Credits:** 3
- AES 4601 - Space Flight Operations II **Credits:** 3
- AES 4603 - Aerospace Operations Systems Analysis and Design **Credits:** 3
- AES 4620 - Elements of Spacecraft Design II **Credits:** 3

Industrial Design Concentration: ~~29~~ 26 credits

Focuses on exposing students to 3D modeling, CNC machines and advanced materials from an industrial design perspective.

- IND 1000 - Introduction to Industrial Design **Credits:** 1
- IND 1100 - Materials I: Materials and Fabrication **Credits:** 3
- IND 1300 - Materials II: Design and Application **Credits:** 3
- IND 1470 - Design Drawing Techniques **Credits:** 3
- ~~IND 2830 - Manufacturing Materials and Processes **Credits:** 3~~
- IND 3000 - Design Thinking **Credits:** 3
- IND 3400 - Product Usability and Ergonomics **Credits:** 3
- IND 3660 - Computer Aided Modeling **Credits:** 3
- IND 3800 - Design for Marketability and Manufacturing **Credits:** 4
- MET 3260 - Direct Digital Manufacturing **Credits:** 3

Mechanical Engineering Technology Concentration: 30 credits

Provides practice in the ability to improve integrated systems, optimize manufacturing processes, adopt state-of-the-art materials, and produce superior quality products at minimal cost. Coursework provides students an opportunity to understand the operation and function of more complex technologies used in manufacturing.

- CHE 1100 - Principles of Chemistry **Credits:** 4
- CHE 1150 - Principles of Chemistry Laboratory **Credits:** 1
- MET 1210 - 3D Modeling **Credits:** 3
- MET 2200 - Materials of Engineering **Credits:** 3
- MET 3215 - Composites Manufacturing **Credits:** 3
- MET 3260 - Direct Digital Manufacturing **Credits:** 3
- MET 3410 - Geometric Dimensioning and Tolerancing **Credits:** 3
- MET 4080 - Computer Aided Manufacturing **Credits:** 3
- MET 4370 - Advanced Composite Structures: Design, Damage, Repair and Testing **Credits:** 3
- MTH 1410 - Calculus I **Credits:** 4

Operations Management Concentration: 24 credits

A holistic perspective on the managerial and organizational systems that are used to make key decisions related to the planning for and day-to-day control of manufacturing operations. Beyond developing competence in analytical and planning skills, particular emphasis is given to the philosophy and methods of lean manufacturing, continuous quality improvement, effective supply chain management and Enterprise Planning.

- BUS 1850 - Introduction to Business **Credits:** 3
- CIS 2010 - Foundations of Information Systems **Credits:** 3
- MGT 3000 - Organizational Management **Credits:** 3
- MGT 3530 - Human Resources Management **Credits:** 3
- MGT 3550 - Operations Management **Credits:** 3
- MGT 4050 - Supply Chain Management **Credits:** 3
- MGT 4360 - Service Operations Management **Credits:** 3
- MGT 4550 - Project Management **Credits:** 3

Unrestricted Electives: 7-19 credits

Senior Experience: 3 credits

- AMS 4940 - Capstone: Advanced Manufacturing Project Planning and Process Development **Credits:** 3
  This course is for individuals with extraordinary circumstances. Must have AMSI Director approval to register for AMS 4940.
  or
- AMS 4950 - Professional Internship **Credits:** 1-15

Summary of Requirements

General Studies Requirements	33 credits
ESSJ Requirement	0-3 credits
AMS Core Courses	44 credits
Selected Concentration	24-30credits
Senior Experience	3 credits
Unrestricted Electives	7-19 credits
Total for the Advanced Manufacturing Sciences Major, B.S.	**120 credits**

Required courses for the major may also count for General Studies and ESSJ requirements, so the total credits listed may be greater than the number required to complete the degree. Therefore, it is important that you work with your advisor to make sure you are meeting requirements for your degree.

Department of Computer Sciences

New Program

Computer Security Major, B.S.

Department of Computer Sciences

Available Program Format(s): In-Person

College of Aerospace, Computing, Engineering, and Design

About the Program

The Department of Computer Sciences offers coursework leading to the Bachelor of Science (B.S.) degree in Computer Security. The Computer Security (CSEC) major is a deeply technical program that is firmly grounded in the computer science discipline. It provides students with fundamental theories as well as extensive opportunities for hands-on applications in cybersecurity. Graduates in Computer Security are positioned for employment in a wide variety of high-demand, high-paying jobs in the cybersecurity field. The CSEC major also prepares students for continued study of Cybersecurity or Computer Science at the graduate level. Students are encouraged to contact the department for further details.

Student Outcomes

The student outcomes to be reached upon completion of this program are an extension of the general computing degree requirements and aligned with the ABET criteria for "Cybersecurity and Similarly Named Computing Programs." Upon graduation, students will have an ability to:

1. **Analyze a complex computing problem and to apply principles of computing and other relevant disciplines to identify solutions.**
2. **Design, implement, and evaluate a computing-based solution to meet a given set of computing requirements in the context of the program's discipline.**
3. **Communicate effectively in a variety of professional contexts.**
4. **Recognize professional responsibilities and make informed judgments in computing practice based on legal and ethical principles.**
5. **Function effectively as a member or leader of a team engaged in activities appropriate to the program's discipline.**
6. **Apply security principles and practices to maintain operations in the presence of risks and threats.**
7. **Formulate or design a security system, process, procedure or program for the intended purpose.**

General Degree Requirements

To earn a degree, students must satisfy all requirements in each of the four areas below, in addition to their individual major requirements.

- Degree and Certificate Requirements
- General Studies Requirements
- Ethnic Studies & Social Justice Graduation Requirement
- Senior Experience Graduation Requirements

Program Requirements

- A total of 120 semester hours are required for graduation.
- A grade of "C-" or better is required in all CS, CSEC, and DSML courses included in the major, all upper-division elective courses, all ancillary courses, and all required mathematics courses. Students should note that programs differ in the minimum grade required.

General Studies Requirements: 33 credits

Students should consult the General Studies Requirements for a list of courses that fulfill the General Studies Requirements for degree completion. Some of the science, mathematics, and ancillary courses required for the CSEC major may partially or fully satisfy specific General Studies requirements.

- Written Communication (6 credits)
- Oral Communication (3 credits)
- Quantitative Literacy (3 credits)
- Arts and Humanities (6 credits)
- Historical (3 credits)
- Natural and Physical Sciences (6 credits)
- Social and Behavioral Sciences (6 credits)
- Global Diversity (0 or 3 credits**)

***Students will fulfill the global diversity requirement by taking an approved course within one of the following categories: arts and humanities; historical; natural and physical sciences; or social and behavioral sciences.*

Ethnic Studies & Social Justice Requirement: 0 or 3 credits

- Students should consult the Ethnic Studies & Social Justice Graduation Requirement for a list of courses that fulfill the ESSJ Requirement for degree completion.
- Many programs include courses that meet this requirement. Students should consult with their advisor to determine what program courses may fulfill this requirement.

Required Mathematics Courses: 8 credits

- MTH 1210 - Introduction to Statistics **Credits:** 4
- MTH 1400 - Precalculus Mathematics **Credits:** 4

  Notes:
  1. MTH 3210 may be substituted for MTH 1210;
  2. (MTH 1110 AND MTH 1120) or MTH 1410 may be substituted for MTH 1400.

Required Ancillary Courses: 9 credits

Professional Presentation Requirement: 3 credits

- COMM 1010 - Presentational Speaking **Credits:** 3

or

- COMM 1100 - Fundamentals of Oral Communication **Credits:** 3

Technical Writing Requirement: 3 credits

- JMP 2610 - Introduction to Technical Writing **Credits:** 3

Computer Security Ethics Requirement: 3 credits

- PHI 3370 - Computers, Ethics, and Society **Credits:** 3

Required Computer Security Courses: 64 credits

Major Core Courses: 56 credits

- CS 1050 - Computer Science 1 **Credits:** 4
- CS 1400 - Computer Organization **Credits:** 4
- CS 2050 - Computer Science 2 **Credits:** 4
- CS 2240 - Discrete Structures for Computer Science **Credits:** 4
- CS 2400 - Assembly Language Programming and Introduction to High Performance Computing **Credits:** 4
- CS 3250 - Software Development Methods and Tools **Credits:** 4
- CS 3600 - Operating Systems **Credits:** 4
- CS 3700 - Networking and Distributed Computing **Credits:** 4
- CS 3750 – Computer and Network Security **Credits:** 4
- CSEC 3755 – Defensive Cyber Operations **Credits:** 4
- CSEC 3756 – Software Reverse Engineering **Credits:** 4
- CSEC 3757 – Critical Infrastructure, Wireless, and Mobile Security**Credits:** 4
- CSEC 3758 – Offensive Cyber Operations **Credits:** 4
- DSML 3850 – Cloud Computing **Credits:** 4

Upper Division Electives: 4 credits

A minimum of 4 semester hours selected from additional upper-division CS, CSEC, or DSML courses. Part of or all these 4 semester hours may also be selected from AES 3600, AES 3880, AES 4601, AES 4200, CPE 3330, or CPE 4370

Senior Experience: 4 credits

- CSEC 4360 - Senior Experience in Cybersecurity **Credits:** 4

Summary of Requirements

General Studies Requirements	33 credits
ESSJ Requirement	0-3 credits

Required Mathematics Courses	8 credits
Professional Presentation Requirement	3 credits
Technical Writing Requirement	3 credits
Computer Security Ethics Requirement	3 credits
Required Major Core Courses	56 credits
Major Upper Division Electives	4 credits
Senior Experience	4 credits
Unrestricted Electives	3-15 credits
Total for the Computer Security Major, B.S.	**120 credits**

Required courses for the major may also count for General Studies and ESSJ requirements, so the total credits listed may be greater than the number required to complete the degree. Therefore, it is important that you work with your advisor to make sure you are meeting requirements for your degree.

Note

As an alternative to the B.S. degree program, the Department of Computer Sciences works with the Center for Individualized Learning to provide students with programs customized to their educational needs.

College of Business

Program Modification

All Business Programs (Undergraduate)

Ethnic Studies & Social Justice Requirement: 0 or 3 credits

- The College of Business encourages business majors to select from the following ESSJ courses. If applicable, we recommend choosing a course within your major, as "infinite dipping" allows the course to count in multiple areas of your degree program. If you have any questions, please contact an advisor.
    - ECO 3600 – Economics of Social Justice
    - MKT 3750 – Ethnic Representations in Marketing
- ~~Students~~ For other courses, students should consult the Ethnic Studies & Social Justice Graduation Requirement for a list of courses that fulfill the ESSJ Requirement for degree completion.
- Many programs include courses that meet this requirement. Students should consult with their advisor to determine what program courses may fulfill this requirement.

Department of Computer Information Systems and Business Analytics

Program Discontinuation (Concentrations)

Computer Information Systems Major, B.S.

Department of Computer Information Systems and Business Analytics

College of Business

Available Program Format(s): In-Person, Hybrid

About the Program

The Computer Information Systems (CIS) bachelor's program offers a challenging education in both general business and modern technology that will allow the student to become part of the fast-paced digital world. This is the only CIS program in Colorado accredited by both **AACSB and ABET**, the world's top accrediting agencies for business and engineering/technology/computing programs.

The Computer Information Systems courses involve hands-on experience in the latest technologies applied in the context of business. Not only does the student have opportunities to take courses in HTML5 and CSS3, Java/Python, PHP and operating systems such as Windows, UNIX and Linux, but can also take advantage of advanced studies in cybersecurity, business analytics, systems analysis and design, database design and administration, telecommunications, local and wide-area networking, data mining, ERP/SAP, Web administration and application development.

Student Outcomes

- SO1: Analyze a complex computing problem and to apply principles of computing and other relevant disciplines to identify solutions.
- SO2: Design, implement, and evaluate a computing-based solution to meet a given set of computing requirements in the context of the program's discipline.
- SO3: Communicate effectively in a variety of professional contexts.
- SO4: Recognize professional responsibilities and make informed judgments in computing practice based on legal and ethical principles.
- SO5: Function effectively as a member or leader of a team engaged in activities appropriate to the program's discipline.
- SO6: Support the delivery, use, and management of information systems within an information systems environment.

The College of Business B.S. programs, including Computer Information Systems, share a common set of four cross-disciplinary core competencies, knowledge, and skills.

Competency 1: Communication - Business students will be able to:

- 1.1 - Communicate effectively through writing.
- 1.2 - Communicate effectively through speaking.

Competency 2: Business Solutions - Business students will be able to analyze a business situation and recommend effective solutions utilizing:

- 2.1 - appropriate technological frameworks.
- 2.2 - appropriate ethical frameworks.
- 2.3 - appropriate global frameworks.

Competency 3: Technological Agility - Business students will be able to:

- 3.1 - understand the impact of current technology on the business environment.

Competency 4: Core Knowledge - Business students will demonstrate competence in required business topics, including accounting, computer information systems, data analytics, economics, ethics, finance, marketing, management, and business law.

General Degree Requirements

To earn a degree, students must satisfy all requirements in each of the four areas below, in addition to their individual major requirements.

- Degree and Certificate Requirements
- General Studies Requirements
- Ethnic Studies & Social Justice Graduation Requirement
- Senior Experience Graduation Requirements

Program Requirements

- A total of 120 semester hours are required for graduation.
- To earn a Bachelor of Science degree in Computer Information Systems, a student must successfully complete 30 or more credit hours of business coursework at MSU Denver. This 30-hour residency requirement can be met by completing any business courses with the prefix ACC, ACCM, BNK, BUS, CIS, ECO, FIN, MGT, MKT, and REL and a course number of 2000 or higher. A student must complete at least twelve (12) upper-division semester hours in Computer Information Systems at MSU Denver.
- In order to graduate, students must maintain a 2.0 average inside the **Business Core** and also maintain a 2.0 inside **Computer Information Systems Major required courses and elective courses.**
- In order to graduate, a grade of "C-" or better is required in MGT 4950.
- Students should note that programs differ in the minimum grade required.

General Studies Requirements: 33 credits

Students should consult the General Studies Requirements for a list of courses that fulfill the General Studies Requirements for degree completion.

- Written Communication (6 credits)
- Oral Communication (3 credits)
    - **Recommended:** COMM 1010 - Presentational Speaking or COMM 1100 - Fundamentals of Oral Communication (one of these courses is required in the College of Business Additional Requirements for Business students completing any Bachelor of Science major.)
- Quantitative Literacy (3 credits)

    - **Recommended:** MTH 1110 - College Algebra for Calculus or MTH 1310 - Finite Mathematics for the Management and Social Sciences (one of these courses is required in the College of Business Additional Requirements for Business students completing any Bachelor of Science major).

- Arts and Humanities (6 credits)
- Historical (3 credits)
- Natural and Physical Sciences (6 credits)
- Social and Behavioral Sciences (6 credits)
    - **Recommended:** ECO 2010 - Principles of Macroeconomics (required in the Business Core for Business students completing any Bachelor of Science major)
    - **Recommended:** ECO 2020 - Principles of Microeconomics (required in the Business Core for Business students completing any Bachelor of Science major)
- Global Diversity (0 or 3 credits**)

** *Students will fulfill the global diversity requirement by taking an approved course within one of the following categories: arts and humanities; historical; natural and physical sciences; or social and behavioral sciences.*

Ethnic Studies and Social Justice Requirement: 0 or 3 credits

- Students should consult the Ethnic Studies & Social Justice Graduation Requirement for a list of courses that fulfill the ESSJ Requirement for degree completion.
- Many programs include courses that meet this requirement. Students should consult with their advisor to determine what program courses may fulfill this requirement.

College of Business Additional Requirements: 7 credits

- COMM 1010 - Presentational Speaking **Credits:** 3

or

- COMM 1100 - Fundamentals of Oral Communication **Credits:** 3

- MTH 1110 - College Algebra for Calculus **Credits:** 4

or

- MTH 1310 - Finite Mathematics for the Management and Social Sciences **Credits:** 4

Business Core: 45 credits

All business majors require foundation course work in all significant areas of business theory and practice. The following courses are required for all students with a BS in a business discipline. Students must maintain a 2.0 average inside the **Business Core**.

- ACC 2010 - Principles of Accounting I **Credits:** 3
- ACC 2020 - Principles of Accounting II **Credits:** 3
- BUS 1850 - Introduction to Business **Credits:** 3 *

- BUS 1950 - Business Communication **Credits:** 3

- BUS 3040 - Global Corporate Social Responsibility and Sustainability **Credits:** 3

or

- ACC 4440 - Accounting Ethics and Professionalism **Credits:** 3

or

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- CIS 2010 - Foundations of Information Systems **Credits:** 3
- CIS 2320 - Descriptive and Predictive Analytics **Credits:** 3
- CIS 3320 - Prescriptive Analytics **Credits:** 3
- ECO 2010 - Principles of Macroeconomics **Credits:** 3
- ECO 2020 - Principles of Microeconomics **Credits:** 3
- FIN 3300 - Managerial Finance **Credits:** 3
- MKT 3000 - Principles of Marketing **Credits:** 3
- MGT 2210 - Legal Environment of Business I **Credits:** 3
- MGT 3000 - Organizational Management **Credits:** 3
- MGT 4950 - Strategic Management **Credits:** 3 **

** Transfer students that transfer in 6 or more credits of business courses will not need to take BUS 1850 but may take any other College of Business 3-credit hour course that does not appear in their Major or Business Core requirements.*

*** "C-" or better must be earned in MGT 4950.*

Computer Information Systems Major Requirements: 33 credits

In order to graduate, students must maintain a 2.0 average inside the Business Core and also maintain a 2.0 inside Computer Information Systems Major required courses, and elective courses.

(24 required credits plus 9 credits from Option 1 or 9 credits from Option 2):

Required Courses: 24 credits

- CIS 2110 - Structured Problem Solving in Information Systems **Credits:** 3
- CIS 3050 - Fundamentals of Systems Analysis and Design **Credits:** 3
- CIS 3060 - Database Management Systems **Credits:** 3
- CIS 3230 - Telecommunication Systems and Networking **Credits:** 3
- CIS 3145 - Business Application Development **Credits:** 3

- CIS 3500 - Information Systems Security **Credits:** 3
- CIS 4050 - Systems Analysis and Design **Credits:** 3
- Any CIS prefix course at the 2000 level or above except CIS 2500.

Option 1: CIS Degree (9 credits)

This option does not require students to declare an area of concentration and thus allows them maximum flexibility in choosing their two upper-division CIS Electives and their CIS Capstone Group course.

- Computer Information Systems Capstone Group (any 4000-level CIS course excluding CIS 4050) (3 credits)
- Upper-division CIS Electives (6 credits)

Option 2: CIS Degree with an Area of Concentration (9 credits)

This option requires students to declare one, and only one, area of concentration. The area of concentration chosen dictates the CIS electives the students take. In addition, students complete the same set of core CIS courses as in Option 1.

Select one of the following concentrations:

~~Application Development~~

- ~~CIS 3030 - Business Web Page Development **Credits:** 3~~
- ~~CIS 4060 - Advanced Database Management Systems **Credits:** 3~~

Business Analytics Concentration

- CIS 3350 - Knowledge Discovery and Data Mining **Credits:** 3
- CIS 3460 - Data Warehousing and Mining **Credits:** 3
- CIS 4370 - Data Science and Big Data Analytics **Credits:** 3

Database Development and Administration

- CIS 3460 - Data Warehousing and Mining **Credits:** 3
- CIS 4060 - Advanced Database Management Systems **Credits:** 3
- CIS 4260 - Database Administration **Credits:** 3

Information Systems Security

- CIS 4500 - Information Systems Security Tools and Techniques **Credits:** 3
- CIS 4550 - Information Systems Security Management and Information Assurance **Credits:** 3

and

- CIS 4280 - Network Installation and Administration **Credits:** 3

or

- CIS 4281 - Network Installation and Administration with UNIX/Linux **Credits:** 3

~~Network Systems and Administration~~

- ~~CIS 3280 - LAN and WAN Systems for Business **Credits:** 3~~

~~and two of the following courses:~~

- ~~CIS 4280 - Network Installation and Administration **Credits:** 3~~
- ~~CIS 4281 - Network Installation and Administration with UNIX/Linux **Credits:** 3~~
- ~~CIS 4500 - Information Systems Security Tools and Techniques **Credits:** 3~~

~~Web Development and Administration~~

- ~~CIS 3030 - Business Web Page Development **Credits:** 3~~
- ~~CIS 4030 - Web Site Administration **Credits:** 3~~
- ~~CIS 4500 - Information Systems Security Tools and Techniques **Credits:** 3~~

Senior Experience: 3 credits

- MGT 4950 - Strategic Management **Credits:** 3 (this course is also required and counted in the Business Core)

Summary of Requirements

General Studies Requirement	33 credits
ESSJ Requirement	0-3 credits
College of Business Additional Requirements	7 credits
Business Core	45 credits
Major Requirements	33 credits
Senior Experience	(counted in business core)
Unrestricted Electives	0-14 credits
Total for the Computer Information Systems Major, B.S.	120 credits

Required courses for the major may also count for General Studies and ESSJ requirements, so the total credits listed may be greater than the number required to complete the degree. Therefore, it is important that you work with your advisor to make sure you are meeting requirements for your degree.

Department of Management

Program Modification

Entrepreneurship Major, B.A.

Department of Management

College of Business

Available Program Format(s): In-Person

About the Program

The Entrepreneurship Major offers courses to learn concepts and tools that are required to start and manage own businesses in dynamic business environments.

Student Outcomes

Students will be able to understand contexts and issues for managing own businesses and be ready to apply those understandings to businesses that they operate now or future. Students will demonstrate competence in the following areas:

1. **Small Business accounting and finance**
2. **Business Law**
3. **Creativity, Innovation, and Venturing**
4. **Feasibility study**
5. **Global Entrepreneurship**
6. **Business planning**
7. **Marketing**
8. **Operationalizing a small business**

General Degree Requirements

To earn a degree, students must satisfy all requirements in each of the four areas below, in addition to their individual major requirements.

- Degree and Certificate Requirements
- General Studies Requirements
- Ethnic Studies & Social Justice Graduation Requirement
- Senior Experience Graduation Requirements

Program Requirements

- A total of 120 semester hours are required for graduation.
- To earn a Bachelor of Arts degree in Entrepreneurship, a student must successfully complete 30 or more credit hours of business coursework at MSU Denver. This 30-hour residency requirement can be met by completing any business courses with the prefix ACC, ACCM, BNK, BUS, CIS, ECO, FIN, MGT, MKT, and REL and a course number of 2000 or higher. A student must complete at least twelve (12) upper-division semester hours in business courses at MSU Denver.
- MSU Denver requires that students successfully complete thirty-nine (39) or more credit hours of upper division coursework.
- Students may take more than four entrepreneurship elective courses. Additional entrepreneurship courses will be counted as unrestricted general electives.
- A grade of C- or better is required for each course in this program to count toward the bachelor's degree. Students should note that programs differ in the minimum grade required.

General Studies Requirements: 33 credits

Students should consult the General Studies Requirements for a list of courses that fulfill the General Studies Requirements for degree completion.

- Written Communication (6 credits)
- Oral Communication (3 credits)
    - **Recommended:** Students may fulfill this requirement by taking a course listed in the College of Business Requirements such as COMM 1010 - Presentational Speaking or COMM 1100 - Fundamentals of Oral Communication
- Quantitative Literacy (3 credits)
- Arts and Humanities (6 credits)
- Historical (3 credits)
- Natural and Physical Sciences (6 credits)
- Social and Behavioral Sciences (6 credits)
    - **Recommended:** Students may fulfill this requirement by taking courses listed in the College of Business Requirements such as ECO 2010 - Principles of Macroeconomics and ECO 2020 - Principles of Microeconomics
- Global Diversity (0 or 3 credits**)

*** Students will fulfill the global diversity requirement by taking an approved course within one of the following categories: arts and humanities; historical; natural and physical sciences; or social and behavioral sciences.*

Ethnic Studies & Social Justice Requirement: 0 or 3 credits

- Students should consult the Ethnic Studies & Social Justice Graduation Requirement for a list of courses that fulfill the ESSJ Requirement for degree completion.
- Many programs include courses that meet this requirement. Students should consult with their advisor to determine what program courses may fulfill this requirement.

College of Business Requirements: 12 credits

- BUS 3040 - Global Corporate Social Responsibility and Sustainability **Credits:** 3

- COMM 1010 - Presentational Speaking **Credits:** 3
  or
- COMM 1100 - Fundamentals of Oral Communication **Credits:** 3

- ECO 2010 - Principles of Macroeconomics **Credits:** 3
- ECO 2020 - Principles of Microeconomics **Credits:** 3

Entrepreneurship Major Requirements: 48 credits

The Entrepreneurship Major provides students with the marketable skills needed to be successful entrepreneurs and pursue both an avocation and an occupation in some combination. The Entrepreneurship Major requirements consist of twelve required courses (36 credit hours) and four approved entrepreneurship elective courses (12 credit hours). A minimum grade of "C-" or better is required in all entrepreneurship major courses.

Required Courses: 36 credits

- ACC 3130 - Accounting for Entrepreneurs **Credits:** 3
- CIS 2010 - Foundations of Information Systems **Credits:** 3
- FIN 2220 - Small Business Financing **Credits:** 3
- BUS 1850 - Introduction to Business **Credits:** 3
- BUS 1950 - Business Communication **Credits:** 3
- MGT 2210 - Legal Environment of Business I **Credits:** 3
- MGT 2500 - Creativity, Innovation, and Business Venturing **Credits:** 3
- MGT 3000 - Organizational Management **Credits:** 3
- MGT 3020 - Entrepreneurship Feasibility and Analysis **Credits:** 3
- MGT 3850 - Global Entrepreneurship **Credits:** 3
- MGT 4420 - Entrepreneurial Business Planning **Credits:** 3
- MKT 3000 - Principles of Marketing **Credits:** 3

Approved Entrepreneurship Electives: 12 credits

Select four courses from below:

- BUS 2250 - Personal Money Management **Credits:** 3

- MGT 3860 - Social Entrepreneurship **Credits:** 3
  or
- MKT 3190 - Marketing for Social Good **Credits:** 3

- MGT 3220 - Legal Environment of Business II **Credits:** 3
- MGT 3240 - Employment and Human Resource Law **Credits:** 3
- MGT 3260 - Managing Business Risk **Credits:** 3
- MGT 3530 - Human Resources Management **Credits:** 3

- MGT 3550 - Operations Management **Credits:** 3
  or
- MGT 4360 - Service Operations Management **Credits:** 3

- MGT 3980 - Internship in Management **Credits:** 1-15

- MGT 4050 - Supply Chain Management **Credits:** 3
  or
- MKT 3410 - Marketing Channels **Credits:** 3

- MGT 4550 - Project Management **Credits:** 3
- MGT 4850 - Organizational and Management Consulting **Credits:** 3
- MGT 4910 - Strategic Leadership **Credits:** 3
- MKT 3100 - Retail Marketing **Credits:** 3
- MKT 3110 - Advertising and Promotion Management **Credits:** 3
- MKT 3250 - Professional Selling **Credits:** 3
- MKT 3300 - Marketing of Services **Credits:** 3
- MKT 3310 - Consumer Behavior **Credits:** 3
- MKT 3910 - New Product Development **Credits:** 3
- MKT 4300 - Social Media Marketing **Credits:** 3

Senior Experience: 3 credits

- MGT 4430 - Operationalizing a Small Business **Credits:** 3

Summary of Requirements

General Studies Requirement	33 credits
ESSJ Requirement	0-3 credits
College of Business Requirements	12 credits
Major Required Courses	36 credits
Major Electives	12 credits
Senior Experience	3 credits
Unrestricted Electives	21-33 credits
Total for the Entrepreneurship Major, B.A.	**120 credits**

Required courses for the major may also count for General Studies and ESSJ requirements, so the total credits listed may be greater than the number required to complete the degree. Therefore, it is important that you work with your advisor to make sure you are meeting requirements for your degree.

Program Modification

Human Resource Management Major, B.S.

Department of Management

College of Business

Available Program Format(s): In-Person

About the Program

People are a company's most important asset. Human Resource personnel play an important role in the recruitment, selection, retention, and training of employees to ensure a company has the best people. The program consists of required courses that build a conceptual foundation for developing a comprehensive human resource department in a company that will aid the company in developing a competitive advantage in the industry. In addition to acquiring knowledge about business functional areas and management, students will develop skills/knowledge that are necessary to be an effective human resource manager. The Human Resource Management degree helps prepare students wishing to pursue a career in the field of human resource management.

Student Outcomes

Human Resource Management Students will demonstrate competence in the following areas:

a. Employment Law
b. Human Resource Management

c. Organizational Behavior
d. Performance Management and Rewards
e. Employee Training and Development
f. Employee Selection
~~g. Strategic Human Resource Management~~

The College of Business B.S. programs, including Human Resource Management, share a common set of four cross-disciplinary core competencies, knowledge, and skills.

Competency 1: Communication - Business students will be able to:

1.1 - Communicate effectively through writing.
1.2 - Communicate effectively through speaking.

Competency 2: Business Solutions - Business students will be able to analyze a business situation and recommend effective solutions utilizing:

2.1 - appropriate technological frameworks.
2.2 - appropriate ethical frameworks.
2.3 - appropriate global frameworks.

Competency 3: Technological Agility - Business students will be able to:

3.1 - understand the impact of current technology on the business environment.

Competency 4: Core Knowledge - Business students will demonstrate competence in required business topics, including accounting, computer information systems, data analytics, economics, ethics, finance, marketing, management, and business law.

General Degree Requirements

To earn a degree, students must satisfy all requirements in each of the four areas below, in addition to their individual major requirements.

- Degree and Certificate Requirements
- General Studies Requirements
- Ethnic Studies & Social Justice Graduation Requirement
- Senior Experience Graduation Requirements

Program Requirements

- A total of 120 semester hours are required for graduation.
- To earn a Bachelor of Science degree in Human Resource Management, a student must successfully complete 30 or more credit hours of business coursework at MSU Denver. This 30-hour residency requirement can be met by completing any business courses with the prefix ACC, ACCM, BNK, BUS, CIS, ECO, FIN, MGT, MKT, and REL and a course number of 2000 or higher.
- In order to graduate, students must maintain a 2.0 average inside the **Business Core**.
- In order to graduate, a grade of "C-" or better is required for each major course to count toward the bachelor's degree.
- In order to graduate, a grade of "C-" or better is required in MGT 4950.
- Students should note that programs differ in the minimum grade required.

General Studies Requirements: 33 credits

Students should consult the General Studies Requirements for a list of courses that fulfill the General Studies Requirements for degree completion.

- Written Communication (6 credits)
- Oral Communication (3 credits)
    - **Recommended:** COMM 1010 - Presentational Speaking or COMM 1100 - Fundamentals of Oral Communication (one of these courses is required in the College of Business Additional Requirements for Business students completing any Bachelor of Science major.)
- Quantitative Literacy (3 credits)
    - **Recommended:** MTH 1110 - College Algebra for Calculus or MTH 1310 - Finite Mathematics for the Management and Social Sciences (one of these courses is required in the College of Business Additional Requirements for Business students completing any Bachelor of Science major).
- Arts and Humanities (6 credits)
- Historical (3 credits)
- Natural and Physical Sciences (6 credits)
- Social and Behavioral Sciences (6 credits)
    - **Recommended:** ECO 2010 - Principles of Macroeconomics (required in the Business Core for Business students completing any Bachelor of Science major)
    - **Recommended:** ECO 2020 - Principles of Microeconomics (required in the Business Core for Business students completing any Bachelor of Science major)
- Global Diversity (0 or 3 credits**)

*** Students will fulfill the global diversity requirement by taking an approved course within one of the following categories: arts and humanities; historical; natural and physical sciences; or social and behavioral sciences.*

Ethnic Studies and Social Justice Requirement: 0 or 3 credits

- Students should consult the Ethnic Studies & Social Justice Graduation Requirement for a list of courses that fulfill the ESSJ Requirement for degree completion.
- Many programs include courses that meet this requirement. Students should consult with their advisor to determine what program courses may fulfill this requirement.

College of Business Additional Requirements: 7 credits

- COMM 1010 - Presentational Speaking **Credits:** 3
  or
- COMM 1100 - Fundamentals of Oral Communication **Credits:** 3

- MTH 1110 - College Algebra for Calculus **Credits:** 4
  or
- MTH 1310 - Finite Mathematics for the Management and Social Sciences **Credits:** 4

Business Core: 45 credits

All business majors require foundation course work in all significant areas of business theory and practice. The following courses are required for all students with a BS in a business discipline. Students must maintain a 2.0 average inside the **Business Core**.

- ACC 2010 - Principles of Accounting I **Credits:** 3
- ACC 2020 - Principles of Accounting II **Credits:** 3

- BUS 1850 - Introduction to Business **Credits:** 3 *
- BUS 1950 - Business Communication **Credits:** 3

- BUS 3040 - Global Corporate Social Responsibility and Sustainability **Credits:** 3
  or
- ACC 4440 - Accounting Ethics and Professionalism **Credits:** 3
  or
  Enrollment in the MPAcc 3+2 Program

- CIS 2010 - Foundations of Information Systems **Credits:** 3
- CIS 2320 - Descriptive and Predictive Analytics **Credits:** 3
- CIS 3320 - Prescriptive Analytics **Credits:** 3
- ECO 2010 - Principles of Macroeconomics **Credits:** 3
- ECO 2020 - Principles of Microeconomics **Credits:** 3
- FIN 3300 - Managerial Finance **Credits:** 3
- MKT 3000 - Principles of Marketing **Credits:** 3
- MGT 2210 - Legal Environment of Business I **Credits:** 3
- MGT 3000 - Organizational Management **Credits:** 3
- MGT 4950 - Strategic Management **Credits:** 3 **

  ** Transfer students that transfer in 6 or more credits of business courses will not need to take BUS 1850 but may take any other College of Business 3-credit hour course that does not appear in their Major or Business Core requirements.*
  *** "C-" or better must be earned in MGT 4950.*

Major Requirements: 18 credits

In order to graduate, a grade of "C-" or better is required for each major required course to count toward the bachelor's degree.

- MGT 3240 - Employment and Human Resource Law **Credits:** 3
- MGT 3530 - Human Resources Management **Credits:** 3
- MGT 4530 - Organizational Behavior **Credits:** 3
- MGT 4620 - Performance Management and Reward Systems **Credits:** 3
- MGT 4640 - Employee Training and Development **Credits:** 3
- MGT 4660 - Employee Selection **Credits:** 3

Major Electives: 9 credits

In order to graduate, a grade of "C-" or better is required for each major elective course to count toward the bachelor's degree.

Select three of the following electives for 9 credit hours:

- MGT 3260 - Managing Business Risk **Credits:** 3
- MGT 3550 - Operations Management **Credits:** 3
- MGT 3980 - Internship in Management **Credits:** 1-15
- MGT 4550 - Project Management **Credits:** 3
- MGT 4830 - Workforce Social Justice **Credits:** 3
- MGT 4850 - Organizational and Management Consulting **Credits:** 3
- MGT 4910 - Strategic Leadership **Credits:** 3

Senior Experience: 3 credits

- MGT 4950 - Strategic Management **Credits:** 3 (this course is also required and counted in the Business Core)

Summary of Requirements

General Studies Requirements	33 credits
ESSJ Requirement	0-3 credits
College of Business Additional Requirements	7 credits
Business Core	45 credits
Major Requirements	18 credits
Major Electives	9 credits
Senior Experience	(counted in business core)
Unrestricted Electives	5-20 credits
Total for the Human Resource Management Major, B.S.	**120 credits**

Required courses for the major may also count for General Studies and ESSJ requirements, so the total credits listed may be greater than the number required to complete the degree. Therefore, it is important that you work with your advisor to make sure you are meeting requirements for your degree.

Program Modification

Management Major, B.S.

Department of Management

College of Business

Available Program Format(s): Online, In-Person, Hybrid

About the Program

The Management Major offers a general degree in Management which will provide the graduate knowledge and skills to manage and successfully lead a department, division, or company in the context of globalization. This degree prepares you for the challenges facing large and small institutions and gives you the tools to meet these challenges.

Student Outcomes

Students who earn the B.S. in Management will demonstrate comprehension and competence in the areas of:

1. Employment Law
2. ~~Entrepreneurship~~ Business Innovation

3. Human Resources and Organizational Behavior
4. Operations Management
5. International Business

The College of Business B.S. programs, including Management, share a common set of four cross-disciplinary core competencies, knowledge, and skills.

Competency 1: Communication - Business students will be able to:

- 1.1 - Communicate effectively through writing.
- 1.2 - Communicate effectively through speaking.

Competency 2: Business Solutions - Business students will be able to analyze a business situation and recommend effective solutions utilizing:

- 2.1 - appropriate technological frameworks.
- 2.2 - appropriate ethical frameworks.
- 2.3 - appropriate global frameworks.

Competency 3: Technological Agility - Business students will be able to:

- 3.1 - understand the impact of current technology on the business environment.

Competency 4: Core Knowledge - Business students will demonstrate competence in required business topics, including accounting, computer information systems, data analytics, economics, ethics, finance, marketing, management, and business law.

General Degree Requirements

To earn a degree, students must satisfy all requirements in each of the four areas below, in addition to their individual major requirements.

- Degree and Certificate Requirements
- General Studies Requirements
- Ethnic Studies & Social Justice Graduation Requirement
- Senior Experience Graduation Requirements

Program Requirements

- A total of 120 semester hours are required for graduation.
- To earn a Bachelor of Science degree in Management, a student must successfully complete 30 or more credit hours of business coursework at MSU Denver. This 30-hour residency requirement can be met by completing any business courses with the prefix ACC, ACCM, BNK, BUS, CIS, ECO, FIN, MGT, MKT, and REL and a course number of 2000 or higher. A student must complete at least 12 upper-division semester hours in Management at MSU Denver.
- In order to graduate, students must maintain a 2.0 average inside the **Business Core**.
- In order to graduate, a grade of "C-" or better is required for each major course (i.e., major required course) to count toward the bachelor's degree.
- In order to graduate, a grade of "C-" or better is required in MGT 4950.
- Students should note that programs differ in the minimum grade required.

General Studies Requirements: 33 credits

Students should consult the General Studies Requirements for a list of courses that fulfill the General Studies Requirements for degree completion.

- Written Communication (6 credits)
- Oral Communication (3 credits)
    - **Recommended:** COMM 1010 - Presentational Speaking or COMM 1100 - Fundamentals of Oral Communication (one of these courses is required in the College of Business Additional Requirements for Business students completing any Bachelor of Science major.)
- Quantitative Literacy (3 credits)
    - **Recommended:** MTH 1110 - College Algebra for Calculus or MTH 1310 - Finite Mathematics for the Management and Social Sciences (one of these courses is required in the College of Business Additional Requirements for Business students completing any Bachelor of Science major).
- Arts and Humanities (6 credits)
- Historical (3 credits)
- Natural and Physical Sciences (6 credits)
- Social and Behavioral Sciences (6 credits)
    - **Recommended:** ECO 2010 - Principles of Macroeconomics (required in the Business Core for Business students completing any Bachelor of Science major)
    - **Recommended:** ECO 2020 - Principles of Microeconomics (required in the Business Core for Business students completing any Bachelor of Science major)
- Global Diversity (0 or 3 credits**)

*** Students will fulfill the global diversity requirement by taking an approved course within one of the following categories: arts and humanities; historical; natural and physical sciences; or social and behavioral sciences.*

Ethnic Studies and Social Justice Requirement: 0 or 3 credits

- Students should consult the Ethnic Studies & Social Justice Graduation Requirement for a list of courses that fulfill the ESSJ Requirement for degree completion.
- Many programs include courses that meet this requirement. Students should consult with their advisor to determine what program courses may fulfill this requirement.

College of Business Additional Requirements: 7 credits

- COMM 1010 - Presentational Speaking **Credits:** 3
  or
- COMM 1100 - Fundamentals of Oral Communication **Credits:** 3

- MTH 1110 - College Algebra for Calculus **Credits:** 4
  or
- MTH 1310 - Finite Mathematics for the Management and Social Sciences **Credits:** 4

Business Core: 45 credits

All business majors require foundation course work in all significant areas of business theory and practice. The following courses are required for all students with a BS in a business discipline. Students must maintain a 2.0 average inside the **Business Core**.

- ACC 2010 - Principles of Accounting I **Credits:** 3
- ACC 2020 - Principles of Accounting II **Credits:** 3

- BUS 1850 - Introduction to Business **Credits:** 3 *
- BUS 1950 - Business Communication **Credits:** 3

- BUS 3040 - Global Corporate Social Responsibility and Sustainability **Credits:** 3
  or
- ACC 4440 - Accounting Ethics and Professionalism **Credits:** 3
  or
  Enrollment in the MPAcc 3+2 Program

- CIS 2010 - Foundations of Information Systems **Credits:** 3
- CIS 2320 - Descriptive and Predictive Analytics **Credits:** 3
- CIS 3320 - Prescriptive Analytics **Credits:** 3
- ECO 2010 - Principles of Macroeconomics **Credits:** 3
- ECO 2020 - Principles of Microeconomics **Credits:** 3
- FIN 3300 - Managerial Finance **Credits:** 3
- MKT 3000 - Principles of Marketing **Credits:** 3
- MGT 2210 - Legal Environment of Business I **Credits:** 3
- MGT 3000 - Organizational Management **Credits:** 3
- MGT 4950 - Strategic Management **Credits:** 3 **

  ** Transfer students that transfer in 6 or more credits of business courses will not need to take BUS 1850 but may take any other College of Business 3-credit hour course that does not appear in their Major or Business Core requirements.*
  *** "C-" or better must be earned in MGT 4950.*

Management Major Required Courses: 18 credits

A grade of "C-" or better is required for each course in this program (i. e., major courses required) to count toward the bachelor's degree.

- MGT 2500 - Creativity, Innovation, and Business Venturing **Credits:** 3
- MGT 3220 - Legal Environment of Business II **Credits:** 3
- MGT 3530 - Human Resources Management **Credits:** 3
- MGT 3550 - Operations Management **Credits:** 3
- MGT 3820 - International Business **Credits:** 3
- MGT 4530 - Organizational Behavior **Credits:** 3

Major Electives: 9 credits

In addition to the six required courses (18 semester hours) for the Management Major, students must select three courses (or one nine credit course) from any MGT 3000- or 4000-level course, including, but not limited to:

- MGT 3230 - International Business Law **Credits:** 3
- MGT 3240 - Employment and Human Resource Law **Credits:** 3
- MGT 3250 - Colorado Water Law and Water Rights Administration **Credits:** 3
- MGT 3260 - Managing Business Risk **Credits:** 3
- MGT 3720 - The Conscious Business: Sustainable Business Strategies for the 21st Century **Credits:** 3
- MGT 3850 - Global Entrepreneurship **Credits:** 3
- MGT 3860 - Social Entrepreneurship **Credits:** 3
- MGT 3980 - Internship in Management **Credits:** 1-15

- MGT 4050 - Supply Chain Management **Credits:** 3
- MGT 4360 - Service Operations Management **Credits:** 3
- MGT 4420 - Entrepreneurial Business Planning **Credits:** 3
- MGT 4550 - Project Management **Credits:** 3
- MGT 4620 - Performance Management and Reward Systems **Credits:** 3
- MGT 4640 - Employee Training and Development **Credits:** 3
- MGT 4660 - Employee Selection **Credits:** 3
- MGT 4830 - Workforce Social Justice **Credits:** 3
- MGT 4850 - Organizational and Management Consulting **Credits:** 3
- MGT 4910 - Strategic Leadership **Credits:** 3

Senior Experience: 3 credits

- MGT 4950 - Strategic Management **Credits:** 3 (this course is also required and counted in the Business Core)

Summary of Requirements

General Studies Requirements	33 credits
ESSJ Requirement	0-3 credits
College of Business Additional Requirements	7 credits
Business Core	45 credits
Major Required Courses	18 credits
Major Electives	9 credits
Senior Experience	(counted in business core)
Unrestricted Electives	5-20 credits
Total for the Management Major, B.S.	**120 credits**

Required courses for the major may also count for General Studies and ESSJ requirements, so the total credits listed may be greater than the number required to complete the degree. Therefore, it is important that you work with your advisor to make sure you are meeting requirements for your degree.

Department of Marketing

Program Modification

Sales Certificate

The Sales Certificate offers marketing majors, students of all other majors and returning students (seeking professional/continued education) an opportunity to add a sales component to their degree program.

An internship is recommended for students with limited sales experience. Twelve credits of upper-division, marketing courses are required; twelve credits must be completed at MSU Denver.

Required Courses

- MKT 3000 - Principles of Marketing **Credits:** 3
- MKT 3160 - Sales Leadership **Credits:** 3
- MKT 3250 - Professional Selling **Credits:** 3
- MKT 4250 - Advanced Selling **Credits:** 3

Elective Courses

- MKT 1260 - Customer Service **Credits:** 3
- MKT 2250 - Introduction to Sales **Credits:** 3
- MKT 3300 - Marketing of Services **Credits:** 3
- MKT 3320 - Inside Sales **Credits:** 3
- MKT 3330 - Marketing and Sales Metrics **Credits:** 3
- MKT 3350 - Social Selling **Credits:** 3
- MKT 3610 - Business-to-Business Marketing **Credits:** 3
- MKT 3750 - Ethnic Representations in Marketing **Credits:** 3
- MKT 3820 Fundraising Strategies for Nonprofit Organizations **Credits:** 3
- MKT 3981 - Internship in Sales **Credits:** 1-15

  Subtotal: 6 credits

Total Credits for the Sales Certificate: 18

Program Modification

Sales Minor

The sales minor is a specialized curriculum designed to equip students with the necessary skills to launch careers in sales. The program emphasizes the professional selling process, the importance of trust and relationships, value creation and communication, sales enablement technology, and what to expect from a career. The minor is for both business and non-business majors (except Professional Selling and Marketing).

Students will take four 3-credit required courses, plus two 3-credit electives, for a total of 18 credits for the minor.

Students must have a minimum cumulative GPA in the minor of 2.0.

The courses cannot be taken pass/fail. Some courses in the minor have prerequisites which must be satisfied. At least nine credit hours of the required courses for this minor must be completed in residency at MSU Denver.

An internship is recommended for students with limited sales experience. Twelve credits of upper-division, marketing courses are required; twelve credits must be completed at MSU Denver.

Required Courses

- MKT 3000 - Principles of Marketing **Credits:** 3
- MKT 3160 - Sales Leadership **Credits:** 3
- MKT 3250 - Professional Selling **Credits:** 3
- MKT 4250 - Advanced Selling **Credits:** 3

Subtotal: 12 credits

Elective Courses

- MKT 1260 - Customer Service **Credits:** 3
- MKT 2250 - Introduction to Sales **Credits:** 3
- MKT 3300 - Marketing of Services **Credits:** 3
- MKT 3320 - Inside Sales **Credits:** 3
- MKT 3330 - Marketing and Sales Metrics **Credits:** 3
- MKT 3350 - Social Selling **Credits:** 3
- MKT 3610 - Business-to-Business Marketing **Credits:** 3
- MKT 3750 - Ethnic Representations in Marketing **Credits:** 3
- MKT 3820 Fundraising Strategies for Nonprofit Organizations **Credits:** 3
- MKT 3981 - Internship in Sales **Credits:** 1-15

Subtotal: 6 credits

Total for Sales Minor: 18 credits

Program Modification

Master of Business Administration

The College of Business at MSU Denver offers a General Master of Business Administration (MBA) with a prescribed, 30-hour requirement. The Master of Business Administration (MBA) with a concentration requires the 27-hour core and 9 hours from ONE selected concentration: Accounting, Business Analytics, Finance, Human Resource Management, or Strategic Management.

Mission of the MSU Denver MBA Program

We transform students into effective business professionals. We do this by providing an accessible, flexible, and high-quality MBA education made possible through excellence in teaching, individualized attention, and hands-on experiences, all at an exceptional value.

MBA Program Goals

The goals of the MSU Denver MBA Program support the missions of the University and the College of Business.

Graduates of the MSU Denver MBA Program will develop and demonstrate competence in written, oral, and collaborative communication skills (LG1-). MSU Denver MBA graduates will be effective problem solvers with a practical, real-world focused perspective supported by familiarity with decision making models and analytical tools (LG2). Finally, MSU Denver MBA graduates will possess both functional and cross-functional business knowledge (LG5) reinforced with an appreciation of the ethical (LG3) and global issues (LG4) that ~~so profoundly affect~~ permeate contemporary business practices.

Accreditation

In addition to the distinction of being the value leader in the Denver metro area the MSU Denver MBA program is accredited as part of the MSU Denver College of Business's AACSB accreditation. AACSB is world-recognized as the leading accreditor of colleges and schools of business. Less than 5% of all business programs worldwide have earned the prestige of AACSB accreditation.

MBA Program Admission

Admission Criteria

Applicants, at a minimum, who hold a bachelor's degree from a regionally accredited college or university in any discipline may apply. Most students are advised to gain two or more years of work experience before enrolling in the MBA program. All admission decisions will be made by an MBA admissions committee.

To apply, begin by choosing the pathway that best fits your academic and professional background:

1. GMAT Waiver
    - Applicants in this pathway first request a GMAT score waiver. Please go to our website for specific waiver processes.*
2. Traditional Admission
    - Applicants in this pathway take the GMAT/GRE, submit official test scores, and are then subsequently reviewed by the Admissions Committee.*
3. Previous Graduate Degree
    - Applicants in this pathway have earned a graduate degree from an accredited college or university.*
4. Professional Portfolio
    - Applicants in this pathway typically have at least five years of significant and progressive business and management experience. Documentation through a portfolio concisely illustrates your upward career trajectory, skills, talents, and why you are equipped to pursue an MBA at MSU Denver.*

**For all pathways, specific processes for applying, and all materials required for a complete application are found on our website.*

Leveling Requirements

Leveling may be required. Please consult with our admissions team.

International Applicants

Additional documentation is required. Please visit the International Student Admissions webpage.

Non-degree Seeking Students

Non-degree seeking students have the option to take up to 9 credit hours of MBA coursework on a space available basis. Admission requirements for a non-degree seeking student are found on our website.

If a non-degree seeking student would like to become degree-seeking, the student must apply to become degree-seeking and must have earned an average GPA of 3.0 or above in the MBA program courses they have completed.

Advancement to Candidacy

All students accepted into the Master of Business Administration program must adhere with the following MBA Program academic policies:

- Students in the MBA program must complete the degree with a cumulative GPA of 3.0 or higher. No more than two (2) grades of C-, C, or C+ will count toward the degree requirements, and no grade lower than a C- will count toward the degree. All grade records remain on the master's transcript and count toward the cumulative GPA. A student who receives three grades of less than a "B-" will be suspended from the program for one academic semester. Upon return from suspension, subsequent grades below a "B-" will result in program dismissal.
- Students must complete the MBA Capstone (MBA 6500) with a minimum grade of B-.
- Students may enroll in no more than fifteen (15) credit hours per semester. Students who wish to take over 15 credits are required to seek approval. For more information, please contact the Associate Dean or MBA Advisor at 303-615-0643 or mba@msudenver.edu.
- Master's students are considered full-time if they are registered for six (6) credit hours, half-time if registered for three (3) credit hours, and less than half-time if registered for two (2) or fewer credit hours.
- Students must complete the master's degree within six (6) calendar years from the semester of initial enrollment.
- Students not enrolled for three (3) consecutive semesters (including summer) must submit a re-admission application. Students requesting re-admission must be in good academic standing and must submit their application for re-admission to the master's program in which they have been enrolled.
- The Student Code of Conduct will apply to all MSU Denver students, regardless of level. Access the Student Code of Conduct.
- Students must adhere to MSU Denver's residency requirement for graduate students.

MBA Program Requirements

- **General MBA.** General MBA students will complete 30 credit hours. This includes 27 credit hours of the MBA core and 3 additional hours, typically MBA 5502. The Director of the MBA, in concert with the MBA Advisor and student, will consider deviations from this recommended course on a case by case basis.
- **MBA with Concentration.** Students will complete 27 credit hours of required MBA Core courses, and a 9 credit hour area of concentration. An MBA concentration is comprised of at least 9 credit hours in a particular discipline, allowing students to develop more in-depth expertise. The overall MBA program requires a minimum total requirement of 36 credit hours.

General MBA (30 credit hours)

MBA Core (27 credit hours)

All MBA students complete course work in each of the major functional areas of business. The MBA core develops and reinforces the functional and cross-functional knowledge component of the MBA program. Once all MBA Core coursework is successfully completed, students take an integrative capstone course that reinforces cross-functional thinking and problem solving.

If student selects to take MBA 5710 - Global Business Management Experience, one core course, at the discretion of the Program Director, is held equivalent to MBA 5710. See 'Optional International Immersion' section.

- MBA 5105 - Accounting Concepts **Credits:** 3
- MBA 5201 - Managerial Analysis and Decision-Making **Credits:** 3
- MBA 5205 - Information Systems Strategy Planning **Credits:** 3
- MBA 5305 - Managerial Economics **Credits:** 3
- MBA 5405 - Corporate Finance **Credits:** 3

- MBA 5510 - Operations and Supply Chain Management **Credits:** 3
- MBA 5580 - Leading through Complexity **Credits:** 3
- MBA 5605 - Marketing Analysis and Planning **Credits:** 3
- MBA 6500 - Integrative and Strategic Perspectives of Organizations **Credits:** 3 (prerequisite: completion of MBA Core)

Subtotal for MBA Core: 27 credit hours

Optional International Immersion Experience (0-3 credit hours)

The MSU Denver MBA strongly recommends international experiences as a component of the MBA. Depending on the trip offered, MBA 5710 may substitute for one of the core MBA courses. Please speak with the Director of the MBA and your MBA Advisor.

- MBA 5710 - Global Business Management Experience **Credits:** 3

MBA General Prescribed Elective (3 credit hours)

If completing the 30 credit hour General MBA, one additional 3 credit hour course completes the MBA degree.

- MBA 5502 - Strategic Project Navigation **Credits:** 3

Total for General MBA: 30 credits

MBA Core (27 credit hours)+ MBA General Prescribed Elective (3 credit hours)

MBA with Concentration (36 credit hours)

Students electing to have a concentration complete the MBA Core (27 credit hours) and ONE of the concentrations below.

MBA Core (27 credit hours)

- MBA 5105 - Accounting Concepts **Credits:** 3
- MBA 5201 - Managerial Analysis and Decision-Making **Credits:** 3
- MBA 5205 - Information Systems Strategy Planning **Credits:** 3
- MBA 5305 - Managerial Economics **Credits:** 3
- MBA 5405 - Corporate Finance **Credits:** 3
- MBA 5510 - Operations and Supply Chain Management **Credits:** 3
- MBA 5580 - Leading through Complexity **Credits:** 3
- MBA 5605 - Marketing Analysis and Planning **Credits:** 3
- MBA 6500 - Integrative and Strategic Perspectives of Organizations **Credits:** 3 (prerequisite: completion of MBA Core)

Subtotal for MBA Core: 27 credit hours

MBA Area of Concentration (9 credit hours)

The MBA area of concentration allows students to develop more in-depth expertise based on their interests and career aspirations.

Accounting Concentration

Select three of the following courses. Note that some of these courses may have pre-requisites that must be satisfied prior to enrollment.

- ACCM 5070 - Taxation for Decision Makers **Credits:** 3
- ACCM 5100 - Financial Accounting and Reporting **Credits:** 3
- ACCM 5400 - Strategic Cost Management **Credits:** 3
- ACCM 5600 - Fraud Examination Awareness Seminar **Credits:** 3
- ACCM 5800 - Governance and Risk Assurance Theory **Credits:** 3
- ACCM 5901 - Risk Assurance and Advisory Engagements **Credits:** 3

Subtotal for Accounting Concentration: 9 credits

Business Analytics Concentration

Select three of the following courses:

- MBA 5210 - Knowledge Discovery using Business Analytics **Credits:** 3
- MBA 5220 - Practical Business Analytics **Credits:** 3
- MBA 5230 - Data Mining for Business Intelligence **Credits:** 3
- MBA 5640 - Analytics and Statistics for Marketing Decisions **Credits:** 3

Subtotal for Business Analytics Concentration: 9 credits

Finance Concentration

Take the following three courses:

- MBA 5460 - Investment Theory and Analysis **Credits:** 3
- MBA 5470 - Advanced Portfolio Analysis **Credits:** 3
- MBA 5480 - Strategic Finance **Credits:** 3

Subtotal for Finance Concentration: 9 credits

Human Resource Management Concentration

Take the following three courses:

- MBA 5550 - Employee and Labor Relations **Credits:** 3
- MBA 5560 - Human Resources: Strategic Talent Management **Credits:** 3
- MBA 5570 - Realizing Competitive Advantage through Human Resource Management **Credits:** 3

Subtotal for the Human Resource Management Concentration: 9 credits

Strategic Management Concentration

Select three of the following courses:

- ACCM 5400 - Strategic Cost Management **Credits:** 3
- MBA 5480 - Strategic Finance **Credits:** 3
- MBA 5502 - Strategic Project Navigation **Credits:** 3
- MBA 5680 - Advanced Strategic Marketing and Analysis **Credits:** 3

Subtotal for Strategic Management Concentration: 9 credits

Total for MBA with Concentration: 36 credits

College of Letters, Arts and Sciences

Vision

To provide essential, fundamental educational experiences for all students, while acknowledging and supporting their differing identities, circumstances, passions, career aspirations, and life goals.

Mission

Our College will attract, educate and champion students from every community who are motivated by learning, discovery, and a desire to make a difference. Through expertly crafted content and hands-on learning, CLAS students attain holistic knowledge, disciplinary expertise, and advanced critical thinking skills. They understand the intersectional qualities of humanity and thought, utilizing this knowledge to thrive and succeed in life's journey.

Principles

Finding Connection Points
Our educational experiences demonstrate the need of both disciplinary and interdisciplinary outlooks and approaches.

Encouraging Discovery and Curiosity
Our students engage in a robust intellectual environment, leading them to new ways of thought, creativity and problem-solving.

Providing Pathways
Our faculty demonstrate an essential connection between education and opportunity; a mechanism that leads to transformative work, engaged communities, and underlying humanity.

Establishing Equitable Practices
Our college aligns our educational missions with the essential work and support structures necessary to dismantle racist and overlapping systems of inequity that often serve as a barrier to greater success.

Ethical, Sustainable, and Progressive Support
We invest our resources fairly and responsibly, providing the necessary capital to launch new ideas, provide growth opportunities, and ensure the disciplines within the college are fully supported.

Academic Departments

The College of Letters, Arts and Sciences (CLAS) offers ~~48~~ 44 undergraduate majors, ~~46~~ 49 undergraduate minors, ~~5~~ 6 certificates, ~~11~~ 10 teacher preparation programs, and multiple micro-credentials. CLAS houses 3 divisions, encompassing 19 departments and 6 interdisciplinary centers, institutes and stand-alone programs. In addition to individual degree requirements,

CLAS faculty teach the majority of the General Studies Program curriculum. The College promotes an interdisciplinary viewpoint, with rigorous programs of study in the fine and performing arts; humanities; social sciences; and natural sciences. These programs prepare students for meaningful careers and a life of substance.

- Department of Africana Studies
- Department of Art
- Department of Biology
- Department of Chemistry and Biochemistry
- Department of Chicana and Chicano Studies
- Department of Communication Studies
- Department of Earth and Atmospheric Sciences
- Department of English
- Department of History
- Department of Journalism and Media Production
- Department of Music
- Department of Philosophy
- Department of Physics
- Department of Political Science
- Department of Psychological Sciences
- Department of Sociology and Anthropology
- Department of Theatre and Dance
- Department of World Languages
- Gender Institute for Teaching and Advocacy

Department of Chemistry and Biochemistry

Program Modification

American Chemical Society Post-Baccalaureate Bridge Program (ACS-BP)

Background:
The American Chemical Society Post-Baccalaureate Bridge Program (ACS-BP) is a credentialed post-baccalaureate bridge experience ~~modeled in accordance with~~ inspired by the ~~ACS~~ structure of the American Chemical Society Bridge ~~Project~~ Program, which integrates ~~culturally responsive~~ data-driven practices into the program curriculum to provide ~~alternative~~ new pathways to graduate programs in the chemical and/or biochemical sciences for all students. ~~from underrepresented/minoritized (URM) groups in STEM.[1] Accordingly,~~ To foster student success, the ACS-BP is tuition-free and offers a competitive salary, housing stipend, and health insurance for the full two years of the program. The goal of this structure is to enable students the space to fully engage, relax into their STEM identity, focus, and thrive while getting high-quality, rigorous preparation for graduate programs in the Chemical and/or Biochemical Sciences.

Advantages of this Program:
Graduate admissions decisions rely heavily on a student's upper-division electives, hands-on teaching experience, immersive research experiences, and scientific ~~literacy~~ communication skills. The ACS-BP provides depth and breadth of opportunity for students in each of those critical areas while introducing students to the graduate school experience. The program curriculum is modeled after the first two years of a graduate program, but unlike grad school, we provide at least three tiers of mentorship for each student to ensure holistic, comprehensive support while they're discovering their graduate school path. Formal and informal networking and collaborative research interactions are also included to provide students with ~~a wealth of~~ opportunities to interact with the broader scientific and ~~URM-centered~~ more focused STEM communities.

Curriculum Specifics:

During the first year, each student completes advanced undergraduate coursework, an effective college teaching experience, graduate school and research support coursework, and research rotations. Students gain invaluable experience and insight while they prepare for the second phase of the program: an Immersive Research ~~Internship~~ Experience. The Immersive Research ~~Internship~~ Experience begins in the second half of their second semester when students transition to hands-on laboratory research with a principal investigator at MSU Denver or a partnering graduate institution for the remainder of the program. During this time, the students create and iteratively refine a poster and an oral presentation on their research project through scheduled presentations at MSU Denver and partnering institutions. The ACS-BP culminates in a capstone project wherein the students prepare a thesis or publication-quality document on their research and present their final poster and oral presentation to a panel of program mentors.

Notes:

1. **While this program is specifically designed for students from URM groups in STEM, we recognize that there are many ways that people can be systemically affected in today's society. Therefore, any student who has experienced overwhelming circumstantial disadvantage and associated resource needs is encouraged to apply. The merit criteria of this program include a comparative evaluation of the applicant's likelihood for graduate school admission with and without this opportunity.**
2. **Additionally, if students are admitted to and attend graduate school at one of our partner universities, a portion of the ACS-BP coursework is designed to directly transfer as credit toward their graduate program.**
3. **The minimum passing grade for the *undergraduate-level* curriculum in this program is a C, and the minimum passing grade is a B- for courses that will transfer into a subsequent graduate program (due to the requirements of our partnering graduate programs).**

ACS-BP Program Requirements (19.5 credits)

To complete the ACS-BP certificate program, each student must complete 19.5 credit hours of coursework as outlined in the categories below. The ~~specifics of the~~ program timeline ~~and curriculum category specifics~~, curriculum categories, and breakdown of Advanced Undergraduate Coursework by research interest area are described in more detail in the following sections.

Program Credit Categories	Credit Hours/Course	Required Credits/Category
~~Internship I/II:~~ T1 Mentorship Coursework	0.5	3
Effective College Teaching in Chemistry: T2 Mentor	0.5	1
Graduate School and Research Support Coursework	0.5 - 1	3.5
Research Rotations	0.5	0.5
Immersive Research ~~Internship: T3 Mentor~~ Experience with a T3 Mentor	0.5 - 2	5
ACS-BP Research Capstone	0.5	0.5
Advanced Undergraduate Coursework*	2 - 4	6
Total Credits for the Program		*19.5*

*For this certificate program, students must complete 6 credits of advanced undergraduate coursework in addition to/ or to replace the coursework completed during their bachelor's degree. For that reason, transfer credits will only be assessed on a case-by-case basis under outstanding circumstances.

Program Timeline

Year 1 - Semester 1 (1.5 - 8.5 credits)

During the first semester, students work closely with their Tier 1 and Tier 2 mentors to plan their course through the program, learn teaching practices, and begin to plan for graduate school admission processes. This is a good time to complete the specified electives in the *Advanced Undergraduate Coursework* and *Graduate School and Research Support Coursework* categories.

Required Core Courses: Credits / Units: 1.5

- CHE 0010 - Effective College Teaching in Chemistry I: T2 Mentor **Credits:** 0
- CHE 4970 - Internship I: T1 Mentor **Credits:** 0.5
- CHE 4971 - Effective College Teaching in Chemistry I **Credits:** 0.5
- CHE 4972 - Navigating Graduate School **Credits:** 0.5

AND

Specified Electives:
Advanced Undergraduate Coursework (0-6 credits)
Graduate School and Research Support Coursework (0-1 credits)

Year 1 - Semester 2 (3.5 - 10.5 credits)

During the second semester, the program begins to ramp up as students continue to work with their Tier 1 and Tier 2 mentors to define their graduate school trajectory. Students select their Tier 3 research mentors and become more involved in graduate preparation coursework, such as *Advanced Science Communication I*. All specified electives in the *Advanced Undergraduate Coursework* and *Graduate School and Research Support Coursework* categories must be completed by the end of Year 1 - Semester 2.

Required Core Courses: Credits / Units: 3

- CHE 0020 - Effective College Teaching in Chemistry II: T2 Mentor Credits: 0
- CHE 4970 - Internship I: T1 Mentor Credits: 0.5
- CHE 4972 - Navigating Graduate School Credits: 0.5
- CHE 4973 - Advanced Science Communication I Credits: 1
- CHE 4976 - Effective College Teaching in Chemistry II Credits: 0.5
- CHE 4977 - Research/Laboratory Rotation Credits: 0.5
  This course is taken during the first 8 weeks of the second semester.

- CHE 4979 - Research/Laboratory Internship I: T3 Mentor Credits: 0.5
  This course is taken during the last 5 weeks of the second semester.

AND

Specified Electives:
Advanced Undergraduate Coursework (0-6 credits)
Graduate School and Research Support Coursework (0-1 credits)

Year 1 - Summer (1 credit)

The students start fully engaging in the *Immersive Research* ~~*Internship*~~ *Experience* portion of the program with their Tier 3 mentor during the summer after their first year. The students continue to work with their Tier 1 mentor to ensure they are adequately supported at every stage of the program.

- CHE 4970 - Internship I: T1 Mentor Credits: 0.5
- CHE 4983 - Research/Laboratory Internship IA: T3 Mentor Credits: 0.5-1
  NOTE: At the end of Year 1 - Summer students will have completed 13 of the 19.5 required credits.

Year 2 - Semester 1 (2.5 credits)

The students continue the *Immersive Research ~~Internship~~ Experience* portion of the program during the second academic year, working with their Tier 1 and Tier 3 mentors to hone their research and science communication skills while submitting their graduate application packages.

- CHE 4978 - Internship II: T1 Mentor Credits: 0.5
- CHE 4985 - Research/Laboratory Internship II: T3 Mentor Credits: 1-2

Year 2 - Semester 2 (3 credits)

As students approach the end of the program, they take *Advanced Science Communication II* to prepare them to complete their capstone projects on the work they've completed during their *Immersive Research ~~Internship~~ Experience*.

- CHE 4978 - Internship II: T1 Mentor Credits: 0.5
- CHE 4984 - Advanced Science Communication II Credits: 0.5
- CHE 4985 - Research/Laboratory Internship II: T3 Mentor Credits: 1-2

Year 2 - Summer (1 credit)

Students work closely with their Tier 1 and Tier 3 mentors to complete their *Research Capstone* projects and present their research to a panel of mentors in an open forum discussion.

- CHE 4978 - Internship II: T1 Mentor Credits: 0.5
- CHE 4998 - ACS-BP Research Capstone Credits: 0.5

Program Credit Categories

~~Internship I/II:~~ T1 Mentorship Coursework (3 credits)

Students must complete **a total of 3 credits** of *~~Internship~~ coursework with their Tier 1 Mentor* ~~during the course of~~ throughout their program. Both of these courses are repeated three times.

- CHE 4970 - Internship I: T1 Mentor Credits: 0.5
- CHE 4978 - Internship II: T1 Mentor Credits: 0.5

Effective College Teaching in Chemistry with a T2 Mentor (1 credit)

Students must complete **a total of 1 credit and associated non-credit coursework** in *Effective College Teaching in Chemistry with Tier 2 Mentorship* ~~during their first two semesters~~.

- CHE 0010 - Effective College Teaching in Chemistry I: T2 Mentor Credits: 0
- CHE 0020 - Effective College Teaching in Chemistry II: T2 Mentor Credits: 0
- CHE 4971 - Effective College Teaching in Chemistry I Credits: 0.5

- CHE 4976 - Effective College Teaching in Chemistry II Credits: 0.5

Graduate School and Research Support Coursework (3.5 credits)

Students must complete **a total of 3.5 credits** of *Graduate School and Research Support Coursework* during their first two semesters.

Core Required Courses: Credits / Units: 2.5

- CHE 4972 - Navigating Graduate School Credits: 0.5
  This course is taken two times; during the first and second semester of the first year in the program.

- CHE 4973 - Advanced Science Communication I Credits: 1
- CHE 4984 - Advanced Science Communication II Credits: 0.5

Specified Electives: Credits / Units: 1

- CHE 3810 - Chemistry Literature and Research Credits: 1
- CHE 4974 - Ethical Practices in Scientific Work Credits: 0.5
- CHE 4975 - Data Handling in Scientific Work Credits: 0.5

Research Rotations (0.5 credits)

Students must complete **a total of 0.5 credits** of *Research/Laboratory Rotations* in the first half of the second semester in the program.

- CHE 4977 - Research/Laboratory Rotation Credits: 0.5

Immersive Research ~~Internship~~ Experience with a Tier 3 Mentor (5 credits)

Students must complete **a total of 5 credits** of *Immersive Research ~~Internship~~ Experience* coursework with their Tier 3 Mentor ~~during the course of~~ throughout their program.

- CHE 4979 - Research/Laboratory Internship I: T3 Mentor Credits: 0.5
- CHE 4983 - Research/Laboratory Internship IA: T3 Mentor Credits: 0.5-1
- CHE 4985 - Research/Laboratory Internship II: T3 Mentor Credits: 1-2

ACS-BP Research Capstone (0.5 credits)

Students must complete **a total of 0.5 credits** of *Research Capstone* coursework with their Tier 1 and Tier 3 Mentors during the course of their program.

- CHE 4998 - ACS-BP Research Capstone Credits: 0.5

Advanced Undergraduate Coursework (6 credits)

Students must complete **a total of 6 credits** of *Advanced Undergraduate Coursework* during their first two semesters in the program. We expect that most students will take advanced electives in chemistry or biochemistry for this program. However, we have identified coursework within and outside the department in the *Research Interest* areas below that could benefit students who want to enter a graduate program in a specific area. Any courses listed below at the 3000 level or higher, including Omnibus courses at the 390 level or higher, will satisfy the *Advanced Undergraduate Coursework* requirement for this program.

Note: Most of these courses have prerequisites that are not listed below. Students are encouraged to discuss their potential coursework with their T1 mentor prior to registering for classes.

Department of Chemistry and Biochemistry - Advanced Undergraduate Coursework

- CHE 3050 - Environmental Chemistry Credits: 3
- CHE 3140 - Spectrometric Identification of Organic Compounds Credits: 3
- CHE 3300 - Inorganic Chemistry Credits: 3
- CHE 3600 - Crime Scene Investigation I Credits: 4
- CHE 3610 - Crime Scene Investigation II Credits: 4
- CHE 3700 - Forensic Chemistry Credits: 4
- CHE 3710 - Forensic Biochemistry Credits: 4
- CHE 4010 - Advanced Organic Chemistry Credits: 3
- CHE 4020 - Synthetic Organic Chemistry Credits: 3
- CHE 4800 - Special Topics in Chemistry Credits: 4
- CHE 4100 - Instrumental Analysis Credits: 3
- CHE 4110 - Instrumental Analysis Laboratory Credits: 2
- CHE 4130 - Quality in the Chemical Industry Credits: 2
- CHE 4160 - QA/QC Methods Laboratory Credits: 1
- CHE 4300 - Advanced Inorganic Chemistry Credits: 4
- CHE 4310 - Biochemistry I Credits: 4
- CHE 4320 - Biochemistry II Credits: 4
- CHE 4350 - Biochemistry Laboratory Credits: 2
- CHE 4390 - Advanced Biochemistry Laboratory Credits: 3
- CHE 4450 - Physical Chemistry: Quantum Mechanics and Spectroscopy Credits: 4
- CHE 4460 - Physical Chemistry: Thermodynamics and Kinetics Credits: 4
- CHE 4480 - Physical Chemistry Laboratory: Quantum and Spectroscopy Credits: 2
- CHE 4490 - Physical Chemistry Laboratory: Thermodynamics and Kinetics Credits: 2

Analytical/Instrumental Research Interest

If students take CHE 4100/CHE 4110 and CHE 4130/CHE 4160 as electives in this *Research Interest* area, they will simultaneously earn the Quality in the Chemical Industry Certificate.

- CHE 3140 - Spectrometric Identification of Organic Compounds Credits: 3
- CHE 4100 - Instrumental Analysis Credits: 3
- CHE 4110 - Instrumental Analysis Laboratory Credits: 2
- CHE 4130 - Quality in the Chemical Industry Credits: 2
- CHE 4160 - QA/QC Methods Laboratory Credits: 1
- ENV 4460 - Advanced Water Quality Analysis Credits: 3
- MTH 3210 - Probability and Statistics Credits: 4

Biochemical Research Interest

- BIO 2310 - Human Anatomy and Physiology I Credits: 4
- BIO 2400 - General Microbiology Credits: 5

Note: *BIO 2310 and BIO 2400 don't count toward advanced electives but may be prerequisites of courses listed in this research interest area, or of general interest if you are considering this type of graduate program. We encourage you to discuss these courses with your Tier 1 mentor (or the Departmental Advisor) when registering for courses.*

- BIO 3350 - Immunology Credits: 3
- BIO 3351 - Immunology Laboratory Credits: 1
- BIO 3600 - General Genetics Credits: 4
- BIO 4050 - Advanced Cell and Molecular Biology Credits: 3
- BIO 4060 - Cellular and Molecular Biology Laboratory Credits: 2
- BIO 4070 - Biology of Cancer Credits: 3
- BIO 4300 - Neurobiology Credits: 3
- CHE 4310 - Biochemistry I Credits: 4
- CHE 4320 - Biochemistry II Credits: 4
- CHE 4350 - Biochemistry Laboratory Credits: 2
- CHE 4390 - Advanced Biochemistry Laboratory Credits: 3

Chemical Education Research Interests

- PSY 2310 - Statistics for the Social and Behavioral Sciences Credits: 3

Note: PSY 2310 doesn't count toward advanced electives but may be a prerequisite of courses listed in this research interest area, or of general interest if you are considering this type of graduate program. We encourage you to discuss these courses with your Tier 1 mentor (or the Departmental Advisor) when registering for courses.

- PSY 3010 - Research Methods in Psychological Science Credits: 3
- PSY 3340 - Cognitive Development and Learning Credits: 3
- PSY 4320 - Advanced Psychological Research Methods Credits: 3
- PSY 4450 - Advanced Psychological Data Science Credits: 3
- PSY 4570 - Cognitive Psychology Credits: 3

Computation Chemistry/Biochemistry Interest

- BIO 3350 - Immunology Credits: 3
- BIO 3600 - General Genetics Credits: 4
- BIO 4050 - Advanced Cell and Molecular Biology Credits: 3
- BIO 4070 - Biology of Cancer Credits: 3
- BIO 4300 - Neurobiology Credits: 3
- BIO 4060 - Cellular and Molecular Biology Laboratory Credits: 2
- CHE 4450 - Physical Chemistry: Quantum Mechanics and Spectroscopy Credits: 4
- CHE 4460 - Physical Chemistry: Thermodynamics and Kinetics Credits: 4
- CHE 4480 - Physical Chemistry Laboratory: Quantum and Spectroscopy Credits: 2
- CHE 4490 - Physical Chemistry Laboratory: Thermodynamics and Kinetics Credits: 2
- CS 2050 - Computer Science 2 Credits: 4
- CS 3120 - Machine Learning Credits: 4
- MTH 2520 - R Programming Credits: 4
- MTH 2540 - Scientific Computing with Python Credits: 4

Note: *CS 2050, MTH 2510, MTH 2520, and MTH 2540 don't count toward advanced electives but may be prerequisites of courses listed in this research interest area, or of general interest if you are considering this type of graduate program. We encourage you to discuss these courses with your Tier 1 mentor (or the Departmental Advisor) when registering for courses.*

- MTH 3210 - Probability and Statistics Credits: 4
- MTH 3220 - Statistical Methods Credits: 4
- MTH 3270 - Data Science Credits: 4
- MTH 3430 - Mathematical Modeling Credits: 4

Environmental Research Interest

- CHE 3050 - Environmental Chemistry Credits: 3
- CHE 4100 - Instrumental Analysis Credits: 3
- CHE 4110 - Instrumental Analysis Laboratory Credits: 2
- ENV 1200 - Introduction to Environmental Science Credits: 3
- ENV 2100 - Environmental Sampling and Analysis Credits: 3
  Note: ENV 1200 and ENV 2100 don't count toward advanced electives but may be prerequisites of courses listed in this research interest area, or of general interest if you are considering this type of graduate program. We encourage you to discuss these courses with your Tier 1 mentor (or the Departmental Advisor) when registering for courses.

- ENV 3422 - Methods of Soil Analysis and Sampling Credits: 1
- ENV 3440 - Energy and Mineral Resources Credits: 4
- ENV 3710 - Environmental Remediation Credits: 3
- ENV 4460 - Advanced Water Quality Analysis Credits: 3
- MTH 3240 - Environmental Statistics Credits: 4

Forensic Chemistry/Biochemistry Research Interest

- CHE 2710 - Introduction to Criminalistics Credits: 3
- CHE 2711 - Introduction to Criminalistics Laboratory Credits: 1
- CHE 2750 - Arson and Explosives Credits: 3
- CHE 2760 - Field Testing and Laboratory Analysis of Drugs Credits: 1
  Note: *CHE 2710, CHE 2711, CHE 2750, and CHE 2760 don't count toward advanced electives but may be prerequisites of courses listed in this research interest area, or of general interest if you are considering this type of graduate program. We encourage you to discuss these courses with your Tier 1 mentor (or the Departmental Advisor) when registering for courses.*

- CHE 3600 - Crime Scene Investigation I Credits: 4
- CHE 3610 - Crime Scene Investigation II Credits: 4
- CHE 3700 - Forensic Chemistry Credits: 4
- CHE 3710 - Forensic Biochemistry Credits: 4
- CJC 4650 - Ethics for the Criminal Justice Professional Credits: 3

Inorganic Research Interest

- CHE 3300 - Inorganic Chemistry Credits: 3
- CHE 4300 - Advanced Inorganic Chemistry Credits: 4
- CHE 4450 - Physical Chemistry: Quantum Mechanics and Spectroscopy Credits: 4
- CHE 4460 - Physical Chemistry: Thermodynamics and Kinetics Credits: 4
- CHE 4480 - Physical Chemistry Laboratory: Quantum and Spectroscopy Credits: 2
- CHE 4490 - Physical Chemistry Laboratory: Thermodynamics and Kinetics Credits: 2

Organic Research Interest

- CHE 3140 - Spectrometric Identification of Organic Compounds Credits: 3
- CHE 4010 - Advanced Organic Chemistry Credits: 3
- CHE 4020 - Synthetic Organic Chemistry Credits: 3

Pharmaceutical Research Interest

- BIO 2310 - Human Anatomy and Physiology I Credits: 4
- BIO 2400 - General Microbiology Credits: 5

  Note: *BIO 2310 and BIO 2400 don't count toward advanced electives but may be prerequisites of courses listed in this research interest area, or of general interest if you are considering this type of graduate program. We encourage you to discuss these courses with your Tier 1 mentor (or the Departmental Advisor) when registering for courses.*

- BIO 3350 - Immunology Credits: 3
- BIO 3351 - Immunology Laboratory Credits: 1
- BIO 3600 - General Genetics Credits: 4
- BIO 4050 - Advanced Cell and Molecular Biology Credits: 3
- BIO 4060 - Cellular and Molecular Biology Laboratory Credits: 2
- BIO 4070 - Biology of Cancer Credits: 3
- BIO 4300 - Neurobiology Credits: 3
- CHE 4310 - Biochemistry I Credits: 4
- CHE 4320 - Biochemistry II Credits: 4
- CHE 4350 - Biochemistry Laboratory Credits: 2
- CHE 4390 - Advanced Biochemistry Laboratory Credits: 3

Physical/Spectroscopy Research Interest

- CHE 3140 - Spectrometric Identification of Organic Compounds Credits: 3
- CHE 4300 - Advanced Inorganic Chemistry Credits: 4
- CHE 4450 - Physical Chemistry: Quantum Mechanics and Spectroscopy Credits: 4
- CHE 4460 - Physical Chemistry: Thermodynamics and Kinetics Credits: 4
- CHE 4480 - Physical Chemistry Laboratory: Quantum and Spectroscopy Credits: 2
- CHE 4490 - Physical Chemistry Laboratory: Thermodynamics and Kinetics Credits: 2

Program Modification

Chemical Industry, National, and Government Laboratory Post-Baccalaureate Bridge Program (ING-BP)

Background:
The Industry, National, and Government Laboratory Post-Baccalaureate Bridge Program (ING-BP) is a credentialed bridge experience that provides intensive training and advanced internship opportunities for students interested in employment performing laboratory-based work in the chemical industry or national or government laboratories. The ING-BP is modeled after the ~~ACS Bridge Project bridge experiences~~ American Chemical Society Bridge Program, which ~~successfully integrate culturally responsive~~ integrates data-driven practices ~~that~~ into the program curriculum to provide ~~alternative pathways for students from underrepresented/minoritized (URM) groups interested in~~ new pathways to graduate programs in the chemical and/or biochemical sciences for all students. However, ~~~ 60%~~ ≈60% of all chemistry BA/BS graduates seek employment in government

or industrial laboratories.[1] Thus, the ING-BP is a first-of-its-kind program that integrates ~~culturally responsive~~ similar data-driven practices to launch students ~~from URM groups~~ into their desired careers~~.~~ (See **Notes**). ~~Accordingly,~~ To foster student success, the ING-BP is tuition-free and offers a competitive salary, housing stipend, and health insurance for the full two years of the program.[2] The goal of this structure is to enable students the space to fully engage, relax into their STEM identity, focus, and thrive while getting high-quality, rigorous preparation for careers in the Chemical and/or Biochemical Sciences.

Advantages of this Program:
Hiring decisions in industry, national, and government laboratories rely heavily on a student's upper-division electives, hands-on laboratory training on relevant instrumentation, and exposure and practice with specific technical writing tasks. Thus, the ING-BP focuses on providing depth and breadth of opportunity for students in each of these critical areas while providing students with real-world experience. The ING-BP curriculum provides unique training opportunities ~~that are~~ based on specific, ongoing feedback from hiring managers and professionals in local industry, government, and national laboratories. These training opportunities are accompanied by a three-tiered mentorship network for each student to ensure holistic, comprehensive support while ~~they discover~~ discovering their desired employment path. Formal and informal networking and collaborative research interactions are also included to provide students with ~~a wealth of~~ opportunities to interact with the broader scientific and ~~URM-centered~~ more focused STEM communities.

Curriculum Specifics:
During the first year, each student completes undergraduate coursework relevant to their career trajectory, a technical writing course, employment support coursework, and laboratory rotations. Students gain invaluable experience and insight while ~~they prepare~~ preparing for the second phase of the program: ~~an~~ the Immersive Laboratory ~~Internship~~ Experience. The Immersive Laboratory ~~Internship~~ Experience begins during the second half of their second semester when students transition to hands-on work with one of our partners in the chemical industry or a government or national laboratory for the remainder of the program. During this time, the students create and iteratively refine a poster and an oral presentation on their research project through scheduled presentations at MSU Denver and partnering institutions. The ING-BP culminates in a capstone project wherein students produce a variety of tailored resumes, engage in mock interviews, and develop a broad set of nuanced professional skills.[3] This supportive, yet highly-customizable structure enables students to gain the tools, credentials, and experience necessary to achieve gainful employment in a competitive entry-level position in the student's field of interest.

Notes:

1. **ACS Salary and Graduate Survey Highlights. https://www.acs.org/careers/salaries/surveys/salary-graduate-survey-highlights.html (accessed 2/1/2025)**
2. **While this program is specifically designed for students from URM groups, we recognize that there are many ways that people can be systemically affected in today's society. Therefore, any student who has experienced overwhelming circumstantial disadvantages and associated resource needs is encouraged to apply. The merit criteria of this program include a comparative evaluation of the applicant's likelihood for appropriately compensated employment in STEM with and without this opportunity.**
3. **~~If desired, students~~ Students can simultaneously earn the Quality in the Chemical Industry Certificate while completing the ING-BP, see the *Advanced Undergraduate Coursework Emphasis Tracks*.**
4. **The minimum passing grade for the curriculum in this program is a C.**

ING-BP Program Requirements (19.5 - 23.5 Credits)

To complete the ING-BP certificate program, each student must complete 19.5 - 23.5 credit hours of coursework, depending on their *Emphasis Track*, as outlined in the categories below. The ~~specifies of the~~ program timeline, ~~and curriculum category~~ curriculum categories, and *Emphasis Track* specifics, are described in the following sections.

Program Credit Categories	Credit Hours/Course	Required Credits/Category
~~Internship I/II:~~ T1 Mentorship Coursework	0.5	3

Technical Employment Support Coursework	0.5	4.5
a. JMP 2610 - Intro to Technical Writing	3	-
b. b. ING-BP Capstone	0.5	-
Laboratory Rotations	0.5	0.5
Immersive Laboratory ~~Internship~~ Experience: T3 Mentor	0.5 - 1	3.5
Advanced Undergraduate Coursework*	1- 4	8-12*
Total Credits for the Program		*19.5 - 23.5*

**Advanced Undergraduate Coursework* Requirements are determined based on the student's chosen *Emphasis Track*. Transfer credits will be assessed on a case-by-case basis.

Program Timeline

Year 1 - Semester 1 (7 - 12 credits)

During the first semester, students work closely with their Tier 1 and Tier 2 mentors to plan their course through the program, learn essential workforce skills, and take essential *Advanced Undergraduate Coursework* that ~~will set students up to take~~ prepares students for the next step in their careers.

Required Core Courses: Credits / Units: 4

- CHE 4970 - Internship I: T1 Mentor **Credits:** 0.5
- JMP 2610 - Introduction to Technical Writing **Credits:** 3

Technical and Employment Support Specified Electives:

- CHE 0015 - Ethical Practices in the Employment Sector: T2 Mentor **Credits:** 0
- CHE 4974 - Ethical Practices in Scientific Work **Credits:** 0.5

OR

- CHE 0025 - Data Handling in the Employment Sector: T2 Mentor **Credits:** 0
- CHE 4975 - Data Handling in Scientific Work **Credits:** 0.5

AND

Specified Emphasis Track Coursework:
Advanced Undergraduate Coursework (3 - 8 cr. hr.)

Year 1 - Semester 2 (2 - 11 credits)

During the second semester, the program ~~begins to ramp~~ ramps up as students continue ~~to work~~ working with their Tier 1 and Tier 2 mentors to define their ~~trajectory into their desired employment sector~~ desired career trajectories. Students select their Tier 3 laboratory mentors and complete their required *Advanced Undergraduate Coursework* and *Technical Employment Support Coursework.*

Required Core Courses:

- CHE 4970 - Internship I: T1 Mentor **Credits:** 0.5
- CHE 4977 - Research/Laboratory Rotation **Credits:** 0.5
  This course is taken during the first 8 weeks of the second semester.

- CHE 4979 - Research/Laboratory Internship I: T3 Mentor **Credits:** 0.5
  This course is taken during the last 5 weeks of the second semester.

Technical and Employment Support Specified Electives:

- CHE 0015 - Ethical Practices in the Employment Sector: T2 Mentor **Credits:** 0
- CHE 4974 - Ethical Practices in Scientific Work **Credits:** 0.5

OR

- CHE 0025 - Data Handling in the Employment Sector: T2 Mentor **Credits:** 0

AND

- CHE 4975 - Data Handling in Scientific Work **Credits:** 0.5

Specified Emphasis Track Coursework:
Advanced Undergraduate Coursework (0 - 9 cr. hr.)

Year 1 - Summer (1 credit)

The students start fully engaging in the *Immersive Laboratory* ~~*Internship*~~ *Experience* portion of the program with their Tier 3 mentor during ~~the summer after~~ their first ~~year~~ summer. The students continue to work with their Tier 1 mentor to ensure they are adequately supported at every stage of the program

- CHE 4970 - Internship I: T1 Mentor Credits: 0.5
- CHE 4983 - Research/Laboratory Internship IA: T3 Mentor Credits: 0.5-1
  Note: At the end of Year 1 - Summer students will have completed at least 15 of their required credits.

Year 2 - Semester 1 (1.5 credits)

The students continue the *Immersive Laboratory* ~~*Internship*~~ *Experience* ~~portion of the program~~ during their second academic year, working with their Tier 1 and Tier 3 mentors to hone their laboratory and science communication skills.

- CHE 4978 - Internship II: T1 Mentor Credits: 0.5
- CHE 4985 - Research/Laboratory Internship II: T3 Mentor Credits: 1-2

Year 2 - Semester 2 (2 credits)

As students approach the end of the program, they take their *ING-BP Capstone* course to prepare them for entering the workforce. ~~They do this the semester~~ The capstone course is completed before their final summer in the program so they can apply the skills they've learned ~~during their capstone course~~ to real job applications while still receiving support through the program.

- CHE 4978 - Internship II: T1 Mentor Credits: 0.5
- CHE 4985 - Research/Laboratory Internship II: T3 Mentor Credits: 1-2
- CHE 4997 - ING-BP Capstone: Resume, Interviews, and Professionalism Credits: 0.5

Year 2 - Summer (1 credit)

Students work closely with their Tier 1 and Tier 3 mentors to get real-time feedback on job applications and interview skills while completing their final laboratory projects.

- CHE 4978 - Internship II: T1 Mentor Credits: 0.5
- CHE 4987 - Research/Laboratory Internship IIA: T3 Mentor Credits: 0.5

Program Credit Categories

~~Internship I/II:~~ T1 Mentorship Coursework (3 credits)

Students must complete **a total of 3 credits** of ~~*Internship*~~ coursework with their *Tier 1 Mentor* ~~during the course of~~ throughout their program. Both of these courses are repeated three times.

- CHE 4970 - Internship I: T1 Mentor Credits: 0.5
- CHE 4978 - Internship II: T1 Mentor Credits: 0.5

Technical Employment Support Coursework with a T2 Mentor (4.5 credits)

Students must complete **a total of ~~4~~ 4.5 credits and associated non-credit coursework ~~during their first two semesters~~** in *Technical Employment Support Coursework with Tier 2 Mentorship*. The ING-BP ~~Capstone~~ capstone course, *CHE 4997 - ING-BP Capstone: Resume, Interviews, and Professionalism* is taken during the second semester of the student's second year.

- CHE 0015 - Ethical Practices in the Employment Sector: T2 Mentor Credits: 0
- CHE 0025 - Data Handling in the Employment Sector: T2 Mentor Credits: 0
- CHE 4974 - Ethical Practices in Scientific Work Credits: 0.5
- CHE 4975 - Data Handling in Scientific Work Credits: 0.5
- CHE 4997 - ING-BP Capstone: Resume, Interviews, and Professionalism Credits: 0.5
- JMP 2610 - Introduction to Technical Writing Credits: 3

Laboratory Rotations (0.5 credits)

Students must complete **a total of 0.5 credits** of *Research/Laboratory Rotations* in the first ~~half~~ 8 weeks of the second semester in the program.

- CHE 4977 - Research/Laboratory Rotation Credits: 0.5

Immersive Laboratory ~~Internship~~ Experience with a Tier 3 Mentor (3.5 credits)

Students must complete **a total of 3.5 credits** of *Immersive Laboratory ~~Internship~~ Experience* coursework with their Tier 3 Mentor ~~during the course of~~ throughout their program.

- CHE 4979 - Research/Laboratory Internship I: T3 Mentor Credits: 0.5
- CHE 4983 - Research/Laboratory Internship IA: T3 Mentor Credits: 0.5-1
- CHE 4985 - Research/Laboratory Internship II: T3 Mentor Credits: 1-2
- CHE 4987 - Research/Laboratory Internship IIA: T3 Mentor Credits: 0.5

Advanced Undergraduate Coursework (8-12 credits)

Students must complete **a total of 8-12 credits** of *Advanced Undergraduate Coursework* during their first two semesters in the program. The following *Emphasis Tracks* are geared toward relevant career trajectories. Any courses at the 3000 level or higher listed in these *Emphasis Tracks* will satisfy the *Advanced Undergraduate Coursework* requirement, including Omnibus courses at the 390 level or higher. If students have already completed some of the required courses within an *Emphasis Track*, those credits can be substituted for the specified elective courses. *Elective Course Sets* listed below within a specific emphasis are suggestions that could deepen the student's experience but are not required to complete that *Emphasis Track*.

Note: The credit totals do not include all pre-requisite courses. Students are encouraged to discuss their potential coursework with their T1 mentor prior to registering for classes.

QA/QC Laboratory Emphasis (8 credits)

This *Emphasis Track* enables students to simultaneously earn the Quality in the Chemical Industry Certificate.

Required Courses: Credits / Units: 9

- CHE 4100 - Instrumental Analysis **Credits:** 3
- CHE 4110 - Instrumental Analysis Laboratory **Credits:** 2
- CHE 4130 - Quality in the Chemical Industry **Credits:** 2
- CHE 4160 - QA/QC Methods Laboratory **Credits:** 1

Elective Course(s) (Not Required)

- CHE 3140 - Spectrometric Identification of Organic Compounds **Credits:** 3

Pharmaceutical/Synthetic Laboratory Emphasis (11 credits)

If students take CHE 4130 and CHE 4160 as electives in this Emphasis Track, they will simultaneously earn the Quality in the Chemical Industry Certificate.

Required Courses: Credits / Units: 11

- CHE 3140 - Spectrometric Identification of Organic Compounds **Credits:** 3
- CHE 4100 - Instrumental Analysis **Credits:** 3
- CHE 4110 - Instrumental Analysis Laboratory **Credits:** 2
- CHE 4010 - Advanced Organic Chemistry **Credits:** 3

Elective Course(s) (Not Required):

- CHE 4020 - Synthetic Organic Chemistry **Credits:** 3
- CHE 4130 - Quality in the Chemical Industry **Credits:** 2
- CHE 4160 - QA/QC Methods Laboratory **Credits:** 1

Biological/Biochemical Laboratory Emphasis (11 credits)

If students take CHE 4130 and CHE 4160 as electives in this Emphasis Track, they will simultaneously earn the Quality in the Chemical Industry Certificate.

Required Courses: Credits / Units: 11

- CHE 4100 - Instrumental Analysis **Credits:** 3
- CHE 4110 - Instrumental Analysis Laboratory **Credits:** 2
- CHE 4310 - Biochemistry I **Credits:** 4
- CHE 4350 - Biochemistry Laboratory **Credits:** 2

Elective Course Set 1 (Not Required):

- CHE 4130 - Quality in the Chemical Industry **Credits:** 2
- CHE 4160 - QA/QC Methods Laboratory **Credits:** 1
- CHE 4320 - Biochemistry II **Credits:** 4
- CHE 4390 - Advanced Biochemistry Laboratory **Credits:** 3

Elective Course Set 2 (Not Required):

- BIO 2310 - Human Anatomy and Physiology I **Credits:** 4
- BIO 2320 - Human Anatomy and Physiology II **Credits:** 4
- BIO 2400 - General Microbiology **Credits:** 5
- BIO 3350 - Immunology **Credits:** 3
- BIO 3351 - Immunology Laboratory **Credits:** 1

Note: BIO - 2310, BIO - 2320, and BIO- 2400 aren't Required Core Courses but could be prerequisites of courses listed in this laboratory Emphasis Track, or of general interest if you want to pursue a position in this employment sector. We encourage you to discuss these courses with your Tier 1 mentor (or the Departmental Advisor) when registering for courses.

Environmental Laboratory Emphasis (11 credits)

This *Emphasis Track* enables students to simultaneously earn the Quality in the Chemical Industry Certificate.

Required Courses: Credits / Units: 12

- CHE 3050 - Environmental Chemistry **Credits:** 3
- CHE 4100 - Instrumental Analysis **Credits:** 3
- CHE 4110 - Instrumental Analysis Laboratory **Credits:** 2
- CHE 4130 - Quality in the Chemical Industry **Credits:** 2
- CHE 4160 - QA/QC Methods Laboratory **Credits:** 1

Elective Courses (Not Required):

- ENV 2100 - Environmental Sampling and Analysis **Credits:** 3
- ENV 3422 - Methods of Soil Analysis and Sampling **Credits:** 1
- ENV 3710 - Environmental Remediation **Credits:** 3
- ENV 4460 - Advanced Water Quality Analysis **Credits:** 3
- **MTH 3240 - Environmental Statistics Credits: 4**

Note: *ENV - 2100 isn't a Required Core Course but could be a prerequisite of courses listed in this laboratory Emphasis Track, or of general interest if you want to pursue a position in this employment sector. We encourage you to discuss these courses with your Tier 1 mentor (or the Departmental Advisor) when registering for courses.*

Criminalistics Laboratory Emphasis (12 credits)

If students take CHE 4130 and CHE 4160 as electives in this Emphasis Track, they will simultaneously earn the Quality in the Chemical Industry Certificate.

Required Courses: Credits / Units: 12

- CHE 2710 - Introduction to Criminalistics **Credits:** 3
- CHE 2711 - Introduction to Criminalistics Laboratory **Credits:** 1
- CHE 3600 - Crime Scene Investigation I **Credits:** 4
- CHE 3610 - Crime Scene Investigation II **Credits:** 4

Elective Courses (Not Required):

- CHE 2750 - Arson and Explosives **Credits:** 3
- CHE 2760 - Field Testing and Laboratory Analysis of Drugs **Credits:** 1
- CHE 3700 - Forensic Chemistry **Credits:** 4

- CHE 3710 - Forensic Biochemistry **Credits:** 4
- CHE 4130 - Quality in the Chemical Industry **Credits:** 2
- CHE 4160 - QA/QC Methods Laboratory **Credits:** 1
- CJC 4650 - Ethics for the Criminal Justice Professional **Credits:** 3

Note: CHE - 2750 and CHE - 2760 aren't Required Core Courses but could be prerequisites of courses listed in this laboratory Emphasis Track, or of general interest if you want to pursue a position in this employment sector. We encourage you to discuss these courses with your Tier 1 mentor (or the Departmental Advisor) when registering for courses.

Data Science Laboratory Emphasis (12 credits)

Required Courses: Credits / Units: 12

- MTH 2520 - R Programming **Credits:** 4
- CS 3120 - Machine Learning **Credits:** 4
- MTH 3270 - Data Science **Credits:** 4

Elective Courses (Not Required):

- MTH 2540 - Scientific Computing with Python **Credits:** 4
- MTH 3210 - Probability and Statistics **Credits:** 4
- MTH 3430 - Mathematical Modeling **Credits:** 4

Note: MTH - 2540 isn't a Required Core Course but could be a prerequisite of courses listed in this laboratory Emphasis Track, or of general interest if you want to pursue a position in this employment sector. We encourage you to discuss these courses with your Tier 1 mentor (or the Departmental Advisor) when registering for courses.

Program Modification

Quality in the Chemical Industry Certificate

The Quality in the Chemical Industry certificate program provides students an in-depth study of the practical application of chemistry in the many industries that rely on chemical analysis. This program equips students with the knowledge of advanced instrumentation, industry standards and practices, and quality assurance / quality control (QA/QC) required for pursuing a successful career as a chemist in industry or government. Students should consult with the department advisor for assistance with degree planning for specific careers after graduation.

This is a certificate program, available to current students, post-baccalaureate students, or current members of the chemical industry seeking additional skills and training for career advancement. A grade of "C" or better is required for each course in this program to count toward the awarded certificate.

Required Courses

- CHE 1810 - General Chemistry II Credits: 4
- CHE 1811 - General Chemistry II Laboratory Credits: 1
- CHE 3000 - Analytical Chemistry Credits: 3
- CHE 3010 - Analytical Chemistry Laboratory Credits: 2
- CHE 4100 - Instrumental Analysis Credits: 3
- CHE 4110 - Instrumental Analysis Laboratory Credits: 2
- CHE 4130 - Quality in the Chemical Industry Credits: 2
- CHE 4160 - QA/QC Methods Laboratory Credits: 1
- JMP 2610 - Introduction to Technical Writing Credits: 3
- ~~Credits: 22~~

Credits: 21

School of Education

Department of Special Education, Early Childhood and Culturally and Linguistically Diverse Education

Program Modification

Spanish Culturally and Linguistically Diverse (CLD) Bilingual Education Specialist K-12 Added Endorsement Program

The Culturally & Linguistically Diverse (CLD) Bilingual Education Specialist K-12 Endorsement is an additional credential that all licensed educators in the state of Colorado can add to their teaching license. This endorsement has been approved by the state to be recognized as an official program and is a non-degree and non-certificate program. Completion of this program will lead to a recommendation for an added endorsement through the Colorado Department of Education (CDE). This recommendation will come from the School of Education and not the University's Office of the Registrar.

A minimum grade of a C- is required in all courses to successfully complete the program and earn a recommendation for this endorsement.

This endorsement is intended for those pre-service and in-service teachers who want to work in bilingual Spanish classrooms. Coursework will provide educators the pedagogy, skills, and knowledge to support second language learners in both their primary language (Spanish) as well as English language development.

The Oral Proficiency Interview is a requirement for specific courses in the program, please see individual course descriptions for details. In addition, a capstone project which measures reading and writing proficiency in Spanish is also required. A score of "advanced low" (grading criteria put forth by the American Council of Teachers of Foreign Language) (ACTFL) must be achieved in order to acquire this endorsement. These exams must be scheduled with the ~~Modern~~ World Languages Department.

Elementary, Special Education and Early Childhood Majors and Licensed Teacher Option

In addition to coursework, students must also demonstrate Spanish oral, reading, and writing proficiency. Oral proficiency will be measured by the Oral Proficiency Interview and reading and writing proficiency will be measured by the Capstone Project. Students must pass these exams with a score of "advanced low."

- CLD 2890 - Second Language Acquisition: K-12 Educational Implications **Credits:** 3
- CLD 3510 - Perspectives in Education for Culturally and Linguistically Diverse Learners **Credits:** 3
- CLD 3910 - Assessment of English Language Learners **Credits:** 3
- CLD 3930 - Spanish Bilingual Education Theory and Research **Credits:** 3
- CLD 3940 - Spanish Bilingual Language and Literacy Development **Credits:** 3
- CLD 3950 - Spanish Bilingual Methods and Materials **Credits:** 3
- CLD 3951 - Spanish Culturally and Linguistically Diverse (CLD) Bilingual Education Specialist K-12 Added Endorsement Field Experience **Credits:** 1

Total: 19

~~Modern~~ World Language Spanish Major Option

In addition to coursework, students must also demonstrate Spanish oral, reading, and writing proficiency. Oral proficiency will be measured by the Oral Proficiency Interview and reading and writing proficiency will be measured by the Capstone Project. Students must pass these exams with a score of "advanced low."

Because field experiences are structured differently in the School of Education (SoE) and the ~~Modern~~ World Languages Department, there was a need to require different field experiences courses for this endorsement.

- CLD 2890 - Second Language Acquisition: K-12 Educational Implications **Credits:** 3
- CLD 3510 - Perspectives in Education for Culturally and Linguistically Diverse Learners **Credits:** 3
- CLD 3910 - Assessment of English Language Learners **Credits:** 3
- CLD 3930 - Spanish Bilingual Education Theory and Research **Credits:** 3
- CLD 3940 - Spanish Bilingual Language and Literacy Development **Credits:** 3
- CLD 3950 - Spanish Bilingual Methods and Materials **Credits:** 3
- LANG 4961 - Field Experience in Teaching World Languages in K-12 **Credits:** 1

  Total: 19

Undergraduate Studies

C2 Hub

Program Modification

~~*Service Learning Program*~~ *Community Engaged Learning Program*

~~Service learning~~ Community Engaged Learning is a form of experiential learning in which students combine classroom experience with community-based service. ~~Service activities~~ Activities provide a forum for students to meet an identified community need while also gaining understanding and experience related to the course content. This method allows students to "learn by doing." The ~~Service Learning~~ Community Engaged Learning Program at MSU Denver also provides mentoring and funds to support faculty who want to integrate this methodology into their courses.

~~For more information on the Service Learning Program, visit https://www.msudenver.edu/service-learning/~~ For more information, visit the Community Engaged Learning website.

~~*Service Learning*~~ *Community Engaged Learning Courses*

While many classes at MSU Denver incorporate ~~service learning~~ community engaged learning activities, specific sections in some fields have been designated as ~~service learning~~ community engaged learning classes. To see a list of current sections for each term, go to the class schedule for the term and look for the chart that allows to you search by specific class type or location ~~(https://www.msudenver.edu/catalog/#d.en.24724) Service Learning has a link in this section~~. ~~Service Learning~~ Community Engaged Learning sections also have the initials ~~"SL"~~ "CEL" at the end of the class name.

Some sections of the below courses may be taught as ~~Service Learning~~ Community Engaged Learning.

- ACC 3110 - Volunteer Income Tax Assistance (VITA) **Credits:** 3
- CDES 3101 - Community-Based Design **Credits:** 3
- CDES 4650 - Studio M **Credits:** 3
- COMM 4450 - Social Movement Rhetoric **Credits:** 3
- CPD 1300 - Transformations: Student Success **Credits:** 3
- DANC 3410 - Skills and Methods of Teaching Dance Technique **Credits:** 3
- DANC 3920 - Dance Entrepreneurship **Credits:** 3

- DANC 4920 - Community-Based Dance and Social Change **Credits:** 3
- EDS 1001 - Advancing Social Justice and Educational Equity: Challenges and Strategies **Credits:** 3
- EDS 3240 - Field Experience: Classroom Management, Planning and Assessment in Secondary Schools **Credits:** 1
- FER 3000 - Applications of Fire Research **Credits:** 3
- FER 3110 - Community Risk Reduction for Fire and Emergency Services **Credits:** 3
- FER 3140 - Fire and Emergency Services Administration **Credits:** 3
- FER 3200 - Fire Prevention, Organization, and Management **Credits:** 3
- FER 3300 - Understanding International Terrorism **Credits:** 3
- FER 3330 - Introduction to Homeland Security **Credits:** 3
- FER 3430 - Personnel Development for Fire and Emergency Services **Credits:** 3
- FER 3460 - Political and Legal Foundations for Fire Protection **Credits:** 3
- FER 3800 - Fire Service Ethics **Credits:** 3
- FER 3911 - Cultural Competence for First Responders **Credits:** 3
- FER 4160 - EMI National Response and Recovery Frameworks **Credits:** 3
- FER 4220 - Fire Dynamics **Credits:** 3
- FER 4260 - Fire Investigation and Analysis **Credits:** 3
- FER 4310 - Fire Protection Structures and Systems **Credits:** 3
- FER 4420 - Fire-Related Human Behavior **Credits:** 3
- FER 4510 - Managerial Issues in Hazardous Materials **Credits:** 3
- FER 4610 - Disaster Planning and Control **Credits:** 3
- FRE 4540 - Literature, Culture, and Translation **Credits:** 3
- GEG 4720 - Planning for Climate Change **Credits:** 3
- GWS 3170 - Social Justice, Self, and Citizenship: A Service Learning Course **Credits:** 3
- HCM 4161 - Disaster Planning and Control **Credits:** 3
- HIS 3782 - History of Human Rights **Credits:** 3
- HLDR 3800 - Servant Leadership in Hospitality **Credits:** 3
- HON 2770 - Dynamics of Change **Credits:** 3
- HSP 4025 - Peer Health Education- Field Experience **Credits:** 3
- ITP 4700 - Community Health Education and Lifestyle Medicine **Credits:** 3
- JMP 4740 - Public Relations in Crises **Credits:** 3
- JMP 4750 - Public Relations Laboratory **Credits:** 3
- MGT 3530 - Human Resources Management **Credits:** 3
- MGT 4850 - Organizational and Management Consulting **Credits:** 3
- MGT 4950 - Strategic Management **Credits:** 3
- MKT 4110 - Brand Management **Credits:** 3
- MTR 2050 - Community Climate Initiatives **Credits:** 2
- NUT 4720 - Nutrition Capstone **Credits:** 3
- PSC 3350 - Global Issues Forum: Variable Topics **Credits:** 3
- PSY 3170 - Social Justice: Self and Citizenship: A Service Learning Course **Credits:** 3
- PSY 4100 - Clinical/Counseling Psychology: Treatment, Practice, and Skills **Credits:** 3
- PUB 4020 - Peer Health Education- Field Experience **Credits:** 3
- SOC 1010 - People, Power, and Progress **Credits:** 3
- SPA 3110 - Advanced Conversation **Credits:** 3
- SPA 4025 - Introduction to Spanish Translation II **Credits:** 3
- SWK 1600 - Community Engagement and Civic Responsibility **Credits:** 3

Student Resources (Undergraduate and Graduate Catalogs)

MSU Denver offers a variety of resources to help students as they pursue their academic goals. Commonly accessed resources are included below as links to the services. Most services are available at no additional cost to the student. Students are encouraged to visit each resource listed to understand the benefits associated with each, and for details on how to access applicable services.

- Academic Advising
- Access Center - *Student disability accommodation and support services*
- Alternative Credit - *Turn work and significant experience into college credit*
- Auraria Immunizations - *Coordination of the State mandated immunization requirement and additional immunization services.*
- Auraria Recovery Community - *A peer-led community of students who are currently in or seeking recovery from substance use and/or other process addictions. All pathways to recovery are welcome!*
- Brother 2 Brother - *A mentoring program focused on academic success and social support for African-American men.*
- C2Hub Scholarship Support - *Fosters a community of scholars through leadership activities, proactive coaching, scholar events, and professional development.*
- Campus Recreation - *A place to build community through healthy living outlets such as working out, group fitness classes, personal training, sports leagues, open recreation, outdoor pursuits and leadership programs.*
- CARE Team - *Provides assessment and case management support for students who are struggling or who may be displaying behaviors of concern.*
- Center for Advanced STEM Education - *Assists STEM majors through academic, financial, and peer mentor supports.*
- Center for Equity and Student Achievement (CESA)
- Civic Engagement Program - *Offering educationally meaningful service opportunities that positively impact the community and provide opportunities for students to develop as engaged citizens.*

- Classroom to Career Hub - *Provides relevant and impactful career development for the full student body.*
- College Assistance Migrant Program (CAMP) - *Designed to meet the academic, financial, and social needs of migrant/seasonal farmworkers and their children in pursuing higher education.*
- Counseling Center- *Individual and group therapy, crisis intervention and outreach to students.*
- Dean of Students Office - *The hub for student support and referrals. Manages/addresses student conduct matters, offers student conflict resolution services, and supports students and the community with other needs.*
- EPIC Scholars Program - *Supports independent students transitioning from foster care, kinship care, adoption, or group homes.*
- Exploratory Advising
- Fraternities and Sororities
- Gender Institute for Teaching and Advocacy (GITA) - *Holistically supports students affected by sexism and other intersecting oppressions through academics, advocacy, and services, which include academic advising, scholarship assistance, advocacy and problem solving, wellness and lactation rooms, a snack stop, and space for community organizing.*
- Health Center at Auraria - *Medical and Mental Health services for students*
- Healthy Pursuits - *Free Group Fit and Mind Body Fitness Classes*
- Honors Program
- Immigrant Services - *Refugee, immigrant students, ASSET, DACA, and English Language Learner support.*
- Immunization Program
- Individualized Degree Program - *Create your own major and minor*
- Information for Pregnant and Parenting Students

- International Studies - *Study abroad opportunities, Exchange Programs, Fullbright Student Award, Erasmus Scholarships.*
- Internships - Support for *students in finding paid or unpaid internship opportunities and gaining academic credit for the experience.*
- LGBTQ Student Resource Center
- Meritus Scholars - *Lifelong learning for older adults*
- Met Media - *Student newspaper, radio, arts/literary magazine, and news broadcasts*
- MSU Denver Student Insurance - *Manages the Student Health Insurance Plan*
- Orientation - *Provides in-person and online programming to support students in successfully starting and engaging in their college experience.*
- Pathways to Possible
- Peer Mentoring - *Provides peer-to-peer support to help students navigate their career path and connect to campus resources.*
- Phoenix Center at Auraria - *Interpersonal violence prevention, awareness, and support*
- Registrar's Office
- Rowdy's Corner (formerly Roadrunner Food Pantry) - *Provides food resources and community referrals for current MSU Denver students.*
- Roadrunners Give Back Volunteer Program
- Service Learning Program - *Classroom learning combined with community-based service. This is a great way to gain real world experience through classwork.*
- Student Care Center - *The hub for student support and referrals. Services include non-clinical case management, student emergency fund, DREAMer emergency fund, roadrunner food pantry, Epic Scholars program, public benefit assistance and Single Stop.*
- Student Conflict Resolution Services - *Provides mediation, conflict coaching, group dynamics services, and the Dialogues Program.*
- Student Emergency Fund - *An application process for students experiencing a financial crisis/emergency.*
- Student Advocacy Council
- Student Health Insurance
- Student Organizations
- Student Travel and Professional Development Funding - *Grant funding available for students to travel to professional conferences and meetings.*
- Supplemental Instruction - *A voluntary program that offers free, regularly scheduled study sessions for traditionally difficult course.*
- TRiO Student Support Services - *Support for first-generation, low-income students, and students with disabilities*
- Tutoring - *Provides individualized support to students in overcoming academic obstacles or barriers.*
- Testing Services - *Offers placement testing for the student body to assist advisers in determining the selection of appropriate courses.*
- Transfer and Adult Student Success - *We support transfer, adult, and re-engaged students by: connecting students to programs and resources based on student needs and interests; building community with other students, staff and faculty; and fostering an environment for academic, professional, and personal success.*
- Undergraduate Research and Creative Scholarship Program - *Resource for students wanting to engage in research activities, presenting and grant opportunities*
- Veterans Education Benefits
- Veteran/Military Student Center
- Writing Center - *One on one writing tutoring and support for all students*

Administration (Undergraduate and Graduate Catalogs)

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Faculty (Undergraduate Catalog)

Allert, Jenny
Chair and ~~Associate~~ Professor-Nursing
B.S., Pacific Lutheran University; M.S., Grand Canyon University

Alvarez, Wilfredo
~~Assistant~~ Associate Professor-Communication Studies
B.S., Rochester Institute of Technology; M.S., Florida State University; Ph.D., University of Colorado-Boulder

Bachelder, Tyler Jon
~~Associate~~ Professor-Aviation & Aerospace Science
B.S., M.S., University of North Dakota

Bao, Ke
~~Assistant~~ Associate Professor-Engineering and Engineering Technology
B.S., Ocean University of China; M.S., University of Alabama; Ph.D., University of Alabama

Brunel, Mallory K.
~~Associate~~ Professor-Nursing
B.S., Regis University; M.S., University of Colorado-Anschutz

Clifton, Gregory T.
Chair and ~~Associate~~ Professor-Accounting
B.B.A., Georgia Southern University; J.D., Thomas M. Cooley Law School; L.L.M., University of Denver

Clockston, Julie
~~Assistant~~ Associate Professor-Social Work
BSW, MSW, Metropolitan State University

Connelly, Jeanne
~~Assistant~~ Associate Professor-Special Education
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Cook, Gina
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Davie, Lincoln
~~Assistant~~ Associate Professor-Exercise and Sport Sciences
B.S., St. Lawrence University; M.Ed, Ph.D., Montana State University

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~~Assistant~~ Associate Professor-Biology
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Erickson, Cynthia
~~Associate~~ Professor-Psychological Sciences
B.S., Nebraska Wesleyan University; M.S., Emporia State University; Ph.D., University of Arizona

Farrell, David E.
~~Assistant~~ Associate Professor-Music
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Furton, Glenn
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Gilbert, Brandon
~~Assistant~~ Associate Professor-Early Childhood Education
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Joo, Sung Hee
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Kendall, Chadwin Thane
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Kern, Amy L.
~~Associate~~ Professor-Industrial Design
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Martin, Joshua P.
~~Associate~~ Professor-Chemistry and Biochemistry
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Martin-Corredor, Lina
~~Assistant~~ Associate Professor-Special Education, Early Childhood
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Meek, Shawn C.
~~Associate~~ Professor-Art
B.F.A., M.F.A., Texas State University-San Marcos

Nunez, Tony P.
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Obermann, Ann
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Pytlinski, Deanne
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~~Assistant~~ Associate Professor-Elementary Education
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Trombley, Renee
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M.S. Criminal Justice & Criminology, Ph.D., Prairie View A7M University

Yoncha, Anne
~~Assistant~~ Associate Professor-Fine Art
B.A., University of Delaware, M.A., University of Montana

Young, Justin
~~Associate~~ Professor-English
M.A., City College of NY, Ph.D., University of Oklahoma

Emeritus

Barnd, Susan Ed.D.
Professor Emeritus - Secondary Education, K-12 Education and Educational Technology

Carnes, William Ph.D.
Professor Emeritus - Management

Evans, Andrew Ph.D.
Professor Emeritus - Earth and Atmospheric Sciences

Harris, Mark Ph.D.
Faculty Emeritus - Music

Liu, Hsiu-Ping Ph.D.
Professor Emeritus - Biology

Lux, Fordyce Ph.D.
Professor Emeritus - Biology

Murphy, Ann Ph.D.
Professor Emeritus - Accounting

Pantos, Andrew Ph.D.
Professor Emeritus - English

Pereira, Marina M.S.W.
Faculty Emeritus – Social Work

Schultz, John Ph.D.
Faculty Emeritus - Sociology and Anthropology

Segall, Mark Ph.D.
Professor Emeritus - Computer Information Systems and Business Analytics

Troyer, Pamela Ph.D.
Professor Emeritus - English

Vigil, Peter Ph.D.
Professor Emeritus - Special Education, Early Childhood and Culturally and Linguistically Diverse Education

Faculty (Graduate Catalog)

Master of Business Administration Faculty

Dr. Gregory S. Black, Professor of Marketing
BA, Brigham Young University; MBA, Brigham Young University; PhD, Washington State University

Dr. Angela Busila, Assistant Professor of Accounting
BSBA, University of Missouri; MBA, Northern Illinois University; Ph.D., Saybrook University

Dr. Alex Fayman, Associate Professor- Finance
B.A., Knox College; M.S., Ph.D., Southern Illinois University

Dr. Glen Furton, ~~Assistant~~ Associate Professor-Economics
B.S., University of Colorado-Colorado Springs; M.S., Texas Tech University; Ph.D., Texas Tech University

Dr. Joseph Hasley, Professor-Computer Information Systems and Business Analytics
B.A., M.A., University of Iowa; Ph.D., University of Colorado-Denver

Dr. Viktor Kiss, Associate Professor of Computer Information Systems and Business Analytics
B.A., M.A., Middlesex University of London; Ph.D., University of Pecs-Hungary

Dr. Edgar Maldonado, Professor-Computer Information Systems and Business Analytics
B.S., Simon Bolivar University-Venezuela; Ph.D., Penn State University

Dr. Alexandre Padilla, Chair and Professor of Economics
BS, Universite de Droit, d'Economie, et des Sciences d'Aix-Marseille III; MA., Universite de Droit, d'Economie, et des Sciences d'Aix-Marseille III; PhD, Universite de Droit, d'Economie, et des Sciences d'Aix-Marseille III

Dr. Letitia Pleis, Professor-Accounting
B.B.A., M.B.A., University of Central Arkansas; Ph.D., University of Northern Texas; C.P.S.; C.M.A.; C.F.M.

Dr. Chandler Reilly, Assistant Professor of Economics
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Dr. Ugur Sener, Assistant Professor of Business Analytics
BS, Middle East Technical University; MBA, Beykent University; Ph.D., Istanbul Aydin University

Dr. Salina Siddique, Associate Professor-Accounting
M.P.A.C.C., University College Central Queensland; Ph.D., Victoria University-Melbourne, Australia

Dr. Johannes Hendrik Snyman, Professor of Management
BA, Harding University; MA, Radford University; MBA, New Mexico State University; PhD, New Mexico State University

Dr. Chao Wei, Assistant Professor
BS, Dalian University of Technology; MS, Illinois Institute of Technology; Ph.D., University of Texas at El Paso

Master of Science in Clinical Behavioral Health, Emphasis in Addictions Counseling Faculty

Dr. Jane Flournoy, Clinical Director of Human Services and Counseling
B.S., Psychology, Colorado State University, M.A., Community Counseling: Marriage and Family Therapy, University of Northern Colorado; Ph.D., Counselor Education and Supervision, Adams State University

Mr. Patrick Griswold, ~~Associate~~ Professor of Human Services and Counseling
AB, Psychology, Hamilton College; MEd, Counseling Psychology, University of Massachusetts; MSN, Nursing Education, University of Massachusetts-Graduate School of Nursing; Clinical Fellow, Addictions Studies, Harvard Medical School, Center for Addictions Studies

Dr. Tara K. Hammar, ~~Associate~~ Professor of Human Services and Counseling
B.S., Birth-Kindergarten Teacher Education, East Carolina University; M.S., Marriage and Family Therapy, East Carolina University; Ph.D., Human Development and Family Studies, University of Connecticut

Dr. Tricia Hudson Matthew, Associate Professor of Human Services and Counseling
BS, Human Services, Metropolitan State University of Denver; MA, Community Counseling, University of Northern Colorado; EdD, Counselor Education and Supervision, Argosy, University of Denver

Dr. Shawn Worthy, Professor of Human Services and Counseling
BA, Mass Communication, University of Illinois; MA, Clinical Psychology, Northern Illinois University; PhD, Clinical Psychology, Northern Illinois University

Master of Professional Accountancy Faculty

Ms. Sheri Betzer, Senior Lecturer of Accounting
B.S., Colorado Mesa State University; CPA, CFE

Ms. Amy Cardillo, Senior Lecturer of Accounting
B.S. Business Administration, Colorado State University; M.S. University of Colorado Denver; MPAcc, Metropolitan State University of Denver; CPA

Dr. Gregory T. Clifton, Chair and ~~Associate~~ Professor of Accounting
B.B.A., Georgia Southern University; J.D., Thomas M. Cooley Law School; LL.M., University of Denver

Ms. Amanda "Jo" Erven, Director of Internal Audit Education and Lecturer of Accounting
B.B.A., M.A., University of Georgia; CPA, CFE, CIA

Dr. Andrew Holt, Professor of Accounting
M.Sc., Ph.D., University of London

Ms. Kristina Kesselring, Assistant Professor of Accounting
BBA, Business Administration, Accounting, Colorado State University - Pueblo; MS, Professional Accountancy, Taxation, MSU Denver; CPA

Dr. Bill Mesa, Associate Professor, Accounting
B.S., M.S. New Mexico State University; D.M. Colorado Technical University; CPA, CGMA

Dr. Minga Negash, Professor of Accounting
B.A., Addis Ababa University; M.B.A., Catholic University of Leuven; Doctor of Economic Science, Vrije Universiteit Brussels

Dr. Letitia Meier Pleis, Professor of Accounting
B.A., M.A., University of Central Arkansas; Ph.D., University of North Texas; CPA, CMA, CFM

Dr. Richard L. Russell, Associate Professor of Accounting
B.B.A., M.P.A., Jackson State University College of Business; J.D., University of Iowa College; CPA

Dr. Salina Siddique, Associate Professor of Accounting
M.P.A.C.C., University College Central Queensland; M.S., Ph.D., Victoria University-Melbourne, Australia

Master of Social Work Faculty

Dr. Kristen Atkinson, Assistant Professor of Social Work
B.A., Eastern Michigan University; M.S.W., San Francisco State University; Ph.D., University of Illinois at Chicago

Dr. Amanda Baranski
B.S., Central Michigan University; M.S.W., University of Michigan; DSW, Rutgers University

Dr. Erin Boyce, Lecturer in Social Work
B.S., M.S.W., University of Missouri-Kansas City; Ph.D., University of Denver

Ms. Bianca Brandon, Lecturer in Social Work
B.S.W., Metropolitan State University of Denver; M.S.W. Colorado State University-Fort Collins

Dr. Julie Clockston, ~~Assistant~~ Associate Professor of Social Work
B.S. and MSW, Metropolitan State University of Denver; DSW, Capella University

Dr. Perri Corvino, Lecturer in Social Work
B.A., SUNY Potsdam; M.S.W., M.A., Loyola University Chicago, Ph.D. Smith College

Ms. Devon Cozens, Lecturer in Social Work
B.A., University of Colorado Boulder; MSW, Metropolitan State University of Denver

Esq. Lori Darnel, Assistant Professor of Social Work
B.A., University of Michigan; J.D., M.S.W, University of Denver

Dr. Shawna Farrell, Lecturer in Social Work
B.A., Humboldt State University; M.S.W, Colorado State University; Ph.D., University of Denver

Dr. Tanya Greathouse, MSW Program Director and Associate Professor of Social Work
B.A., University of Colorado-Boulder; M.S.W., University of Denver; Ph.D., Smith College

Dr. Christian Marcel Itin, Professor of Social Work
B.S., Cornell University; M.S.W., Ph.D., University of Denver

Ms. Laura Montero, Lecturer in Social Work
B.S., Arizona State University; M.S.W., University of Michigan

Mr. Brad Palmertree, Lecturer in Social Work
B.S., Lambuth University; M.S.W., University of Michigan

Dr. Jessica Retrum, Chair and Professor of Social Work
B.S., Illinois State University; M.S.S.W., University of Wisconsin-Madison; Ph.D., University of Denver

Dr. Eileen Starr, ~~Associate~~ Professor of Social Work
B.A., Marywood Catholic University; M.S.W., Ph.D., Widener University

Dr. Ann Sullivan, Clinical Field Faculty
B.S., Santa Clara University; M.S.W. and PhD., Colorado State University

Dr. Adrianna Taylor, Assistant Professor of Social Work
B.S., North Carolina State University; M.S.W. North Carolina State University, DSW, Simmons University

Dr. Kathryn A. Trujillo, Associate Professor of Social Work
B.A., University of Colorado-Boulder; M.S.W., Ph.D., University of Denver

Course Descriptions (Undergraduate)

M=Course Modification N=New Course C=Conversion to Regular Course

(M) AES 1010 - Introduction to Aviation and Aerospace Operations

Credits: 4
Description: Students are introduced to a comprehensive exploration of the principles, practices, and challenges of aviation and aerospace management. Students will examine the operations, regulations, and strategic planning involved in managing complex aviation and aerospace systems, including airports, airlines, spaceports, and air traffic control. The course covers essential management areas such as safety and risk management, aerospace mission logistics, regulatory compliance, and sustainability within the aviation and space sectors. ~~The student is introduced to essential aviation and aerospace industry operations and related systems used within or by airports, space ports, airlines, air traffic control and weather observation and reporting services. General meteorology and weather-related issues that affect airport, space port, airline, and air traffic control operations will also be examined.~~

(M) AES 1100 - Private Pilot Ground

Credits: 4
Description: Students participate in basic studies in aircraft operation, performance, aerodynamics, and design. Federal aviation regulations and other flight publications needed for private pilot operations are examined. Weather theory and reports and basic flight physiology in the context of flight safety are examined. Skills of air navigation by pilotage, dead reckoning, and the use of fundamental tools of air navigation including radio navigational aids are explored.
Note: This course is restricted to those students seeking FAA flight certification at the Private Pilot level within the Professional Flight Officer Concentration, and those students within the Air Traffic Control Concentration~~.~~, Aviation Technology Minor, Unmanned Aircraft Systems Certificate, or IDP degree program.

(M) AES 1500 - Private Pilot Flight Lab

Credits: 2
Prerequisite(s): Instructor Permission
Description: The course is designed to enable a student to obtain credit for earning an FAA Private Pilot certificate under either Federal Aviation Regulations Part 61 or Part 141. A minimum of 35 hours of

flight time is required. Course credit is contingent on the student obtaining the FAA Private Pilot certificate.
Note: AES Flight Lab courses are not eligible for VA funding for military students; therefore, military students will be offered VA-approved AES elective courses. Flight training is still required for all professional flight officer concentration students. Only VA military students can use AES electives in place of the flight lab for the professional flight officer concentration. All other students must enroll in the flight lab course. VA students should consult an aviation academic advisor for a list of VA-approved AES electives.

(C) AES ~~190F~~ 1950 - Aerospace Digitalization: Technology and Processes ~~(Spring 2024)~~

Credits: 3
Description: Students are introduced to the concepts of digitization, digitalization, and digital transformation, as well as enabling technologies and business processes, including the fourth industrial revolution in the aviation and space sectors of the aerospace ~~domain~~ industry. ~~Digitalization applications are discussed in~~ This course specifically focuses on the ~~context~~ application of ~~digital transformation~~, those concepts, technologies, and processes ~~specifically~~ from the aerospace supply chain and manufacturing perspectives.

(M) AES 2050 - Aviation and Aerospace History and Development

Credits: 3
Description: ~~This course examines~~ Students examine how individuals and defining events of the past influenced the development of aviation and aerospace science. From early myths to advents in aerospace science, such as advances in propulsion systems, structural materials, navigation techniques, high altitude flights, and weather analysis~~, UAV/UAS in development,~~ have had upon the progress of manned flight in and ~~space exploration~~ beyond the atmosphere are considered. ~~We~~ Students vicariously relive many of the extraordinary experiences of early aviators and space pioneers. The evolution of aviation science in comparison to aerospace science is described. Historical events are analyzed for applicability to embracing future opportunities and career paths in aviation and space science.

(M) AES 2500 - Instrument Pilot Flight Lab

Credits: 2
Prerequisite(s): AES 1100 and instructor permission
Description: This course is designed to enable a student to obtain credit for earning an FAA Instrument rating under either Federal Aviation Regulations Part 61 or Part 141. A minimum of 40 hours of instrument flight time is required and course credit is contingent on the student obtaining the FAA Instrument rating.
Note: AES Flight Lab courses are not eligible for VA funding for military students; therefore, military students will be offered VA-approved AES elective courses. Flight training is still required for all professional flight officer concentration students. Only VA military students can use AES electives in place of the flight lab for the professional flight officer concentration. All other students must enroll in the

flight lab course. VA students should consult an aviation academic advisor for a list of VA-approved AES electives.

(M) AES 3220 - Aviation and Aerospace Law

Credits: 3
Prerequisite(s): AES 1010 or AES 1100 and ~~Junior or Senior~~ Sophomore Standing
Description: This course provides an overview of fundamental aviation and space law. Concepts and terminology of constitutional law, administrative law, contract, and tort law as they relate to governmental organization, regulatory and international organizations, the regulatory environment, and regulation enforcement are highlighted. Principles of aviation liability and protections against liability claims are analyzed. Basic principles of space law are presented.

(M) AES 3230 - Airline Management

Credits: 3
Prerequisite(s): ~~Junior or Senior Standing or Permission of Instructor~~ At least Sophomore standing or permission of instructor
Description: This course presents airline management issues, including the history and current organization of the airline industry, its economic impact on the society, and major management issues airlines face today. Discussions of the airline industry's unique legal history, airline company organization, labor relations, airline financing, and international aviation are included.

(M) AES 3240 - Airline Planning

Credits: 3
Prerequisite(s): ~~Junior or Senior Standing, or Permission of Instructor~~ At least Sophomore standing or permission of instructor
Description: This course presents airline management issues, including the history and current organization of the airline industry, its economic impact on the society, and major management issues airlines face today. Discussions of the airline industry's unique legal history, airline company organization, labor relations, airline financing, and international aviation are included.

(M) AES 3520 - Commercial Single-Engine Flight Lab

Credits: 2
Prerequisite(s): FAA Private Pilot certificate and Permission of instructor
Description: The course is designed to enable a student to obtain credit for earning the FAA Commercial Pilot certificate under either Federal Aviation Regulations Part 61 or Part 141. Course credit is contingent on the student obtaining the FAA Commercial Pilot certificate.
Note: AES Flight Lab courses are not eligible for VA funding for military students; therefore, military students will be offered VA-approved AES elective courses. Flight training is still required for all professional flight officer concentration students. Only VA military students can use AES electives in place of the flight lab for the professional flight officer concentration. All other students must enroll in the

flight lab course. VA students should consult an aviation academic advisor for a list of VA-approved AES electives.

(M) AES 3600 - Space Flight Operations I

Credits: 3
Prerequisite(s): At least ~~Junior~~ Sophomore standing or permission of instructor
Description: Students review the history of space exploration and analyze reasons to explore space. Space weather in the context of the space environment is discussed along with an introduction of associated hazards to space operations. An overview of space policies, treaties, and international laws is be presented in the context of their influence on space operations. Additional topics focus on a framework for space mission operations, including an introduction to identifying and understanding space mission applications, orbits, and systems comprising modem space vehicles with an emphasis on getting to space.

(M) AES 3620 - Aerospace Systems Project and Mission Scheduling

Credits: 3
Prerequisite(s): ~~AES 3600 and~~ Junior Standing or Permission of Instructor
Description: Students ~~in this course~~ develop a basic understanding of project management and how it is ~~used in~~ applied within the aerospace industry by analyzing project management knowledge areas and processes in context of aerospace applications. Previous aerospace projects will be analyzed from a project management perspective ~~so students learn~~ to determine how to ~~utilize~~ leverage project management principles in real world applications.

(M) AES 3880 - Aviation Security

Credits: 3
Prerequisite(s): ~~Junior~~ Sophomore Standing, or Permission of Instructor
Description: The history, development and strategies of prevention and response to aviation security issues are studied in this course. The role of international and national agencies, including statutes and regulations are detailed, with particular emphasis on Transportation Security Regulations as they apply to airports and aircraft operators. The history of air terrorism is addressed, focusing on terrorist threats and governmental responses before and after 9/11/2001.
Note: Credit will be granted for only one prefix: AES or CJC.
Cross Listed Course(s): CJC 405M

(M) AES 4200 - Airport Planning and Management I

Credits: 3
Prerequisite(s): At least ~~junior~~ Sophomore standing or ~~P~~permission of instructor
Description: This course introduces airport planning, management, and operations concepts. Topics covered include air traffic, forecasting, sources of revenues and expenses, management of revenue-producing facilities, and the U.S. Federal Aviation Administration regulations dealing with airport

operations and security. Current problems with environmental impact, land use planning and control, airport capacity and delay, public relations, airport finance, airport privatization, liability, and economic impact are introduced.

(M) AES 4500 - Commercial Multi-Engine Flight Lab

Credits: 2
Prerequisite(s): FAA Commercial Pilot certificate and Permission of instructor
Description: This course covers multi-engine aircraft operations. A minimum of 10 hours of flight training time are required. The FAA multiengine rating must be obtained to receive credit for this course. *Note:* AES Flight Lab courses are not eligible for VA funding for military students; therefore, military students will be offered VA-approved AES elective courses. Flight training is still required for all professional flight officer concentration students. Only VA military students can use AES electives in place of the flight lab for the professional flight officer concentration. All other students must enroll in the flight lab course. VA students should consult an aviation academic advisor for a list of VA-approved AES electives.

(M) AES 4510 - Flight Instructor Flight Lab

Credits: 2
Prerequisite(s): FAA Commercial/Instrument Pilot certificate and instructor permission
Description: This course provides the basic aeronautical knowledge and flight experience necessary for the FAA Certified Flight Instructor certificate. Fifteen hours of flight training are required and the FAA Certified Flight Instructor certificate must be obtained to receive credit for this course.
Note: AES Flight Lab courses are not eligible for VA funding for military students; therefore, military students will be offered VA-approved AES elective courses. Flight training is still required for all professional flight officer concentration students. Only VA military students can use AES electives in place of the flight lab for the professional flight officer concentration. All other students must enroll in the flight lab course. VA students should consult an aviation academic advisor for a list of VA-approved AES electives.

(M) CIS 3320 - Prescriptive Analytics

Credits: 3
Prerequisite(s): ENG 1020 or ENG 1021; completion of General Studies requirements in Oral Communication; "C-" or better in MTH 1310 or MTH 1110; CIS 2320; and at least junior standing.
Description: ~~The course introduces~~ Students learn the fundamental principles and techniques of quantitative methods as they are applied to solve complex decision-making problems within a business environment. ~~The course covers topics such as~~ Students are introduced to and practice linear programming, transportation and assignment problems, project management, decision analysis, queuing analysis, simulation, forecasting, and inventory management. Students learn how to formulate and solve multiple quantitative models, interpret the results, and make informed business decisions based on them. ~~They also~~ Students acquire practical skills in using software tools for problem solving, such as Excel

Solver. Upon completion of the course, students have a solid understanding of quantitative methods concepts and techniques and will be able to apply them to real-world business decision-making problems.

(N) CJC 3910 - Open-Source Intelligence

Credits: 3
Description: This course teaches students primarily how to use open source intelligence (OSINT) to gather information and intelligence for law enforcement. Media as well as Internet in general are the main open sources to be used in this course. These sources use non-sensitive intelligence while still providing valuable information to law enforcement. Other topics such as the use of open source intelligence by private entities and non-governmental organizations will also be discussed. After taking this course, students will be able to research and evaluate open source information as well as produce valuable intelligence for prediction, prevention, investigation, and prosecution of criminals.
Cross Listed Course(s): CYB 3900

(M) ~~CS~~ CSEC 3755 - ~~Computer Security Offense and Defense~~ Defensive Cyber Operations

Credits: 4
Prerequisite(s): CS 3700~~ with "C " or better, or permission of instructor~~ and CS 3750
Description: ~~This course covers the basics of performing vulnerability assessments for networks, computers, and programs. Coverage includes reconnaissance and exploitation tools, injections, weak passwords and authentication, and memory corruption techniques. The course also covers defense techniques including firewalls, intrusion detection/prevention systems, log analysis, event correlation, and security information and event management. The course addresses how programs are compromised via buffer overflows and heap corruption, along with techniques to counter those attacks.~~ Students develop the skills and knowledge necessary to defend against sophisticated cyber threats by engaging in adversarial thinking. They learn to anticipate and counteract potential adversaries' actions, identify and mitigate software vulnerabilities, and implement robust security measures through a combination of theoretical instruction and hands-on practice. The course includes essential system administration tasks, network security, and the detection and removal of malicious activity. By applying these skills, students practice securing systems and data, responding to cyber incidents, and maintaining infrastructure integrity.

(N) CSEC 3756 - Software Reverse Engineering

Credits: 4
Prerequisite(s): CS 3600
Description: Students develop essential skills in understanding and analyzing software without access to its source code, a critical capability in cybersecurity. Through hands-on labs and theoretical study, students reverse engineer software of unknown origin, including malware, and document their findings. The course covers techniques for modifying software functionality, recognizing common programming constructs in assembly language, and analyzing network traffic to uncover custom communication protocols. Students explore methods for identifying software vulnerabilities using a range of analysis

techniques. Students apply these skills in real-world scenarios, contributing to tasks such as malware analysis and auditing of closed-source software.

(N) CSEC 3757 - Critical Infrastructure, Wireless, and Mobile Security

Credits: 4
Prerequisite(s): CS 3700
Description: Students address the security challenges of three key areas: wireless protocols, mobile devices, and industrial control systems (ICS) and supervisory control and data acquisition (SCADA) systems from a critical infrastructure perspective. They explore vulnerabilities and security mechanisms in wireless networks, assess the risks associated with mobile devices, and examine the unique requirements for securing ICS and SCADA systems. Through theoretical study and practical application, students practice implementing effective security strategies across these diverse and dynamic environments.

(N) CSEC 3758 - Offensive Cyber Operations

Credits: 4
Prerequisite(s): CSEC 3755 and CSEC 3756
Description: Students engage with advanced techniques in offensive cyber operations. Through a combination of theoretical frameworks and hands-on labs, they develop the skills necessary to conduct comprehensive cyber operations in a controlled environment. Emphasis is placed on performing sophisticated cyber tasks, such as gathering intelligence, identifying vulnerabilities, and executing complex cyber attacks. Students navigate and manipulate systems using a variety of tools and techniques, while also gaining experience in evasion and covert communication. Throughout the course, students practice applying these skills in practical scenarios, achieving specific objectives while operating under constraints.

(N) CSEC 4360 - Senior Experience in Cybersecurity

Credits: 4
Prerequisite(s): Senior standing, completion of all lower-division CS courses required for the BS CSEC degree, CSEC 3758, JMP 2610, PHI 3370, and (COMM 1010 or COMM 1100), all with grades of "C−" or better; or permission of instructor.
Description: Students participate in a senior-level capstone project that culminates their learning and allows them to apply their domain knowledge and communication skills. They identify and work on semester-long projects that require the integration and application of knowledge and skills acquired from earlier courses. Some projects may be solicited from constituents within MSU Denver or externally, with progress evaluated in conjunction with constituent representatives.

(M)CYB 3900 - Open-Source Intelligence

Credits: 3
Description: This course teaches students primarily how to use open source intelligence (OSINT) to

gather information and intelligence for law enforcement. Media as well as Internet in general are the main open sources to be used in this course. These sources use non-sensitive intelligence while still providing valuable information to law enforcement. Other topics such as the use of open source intelligence by private entities and non-governmental organizations will also be discussed. After taking this course, students will be able to research and evaluate open source information as well as produce valuable intelligence for prediction, prevention, investigation, and prosecution of criminals.
Cross Listed Course(s): CJC 3910

(M) ENV 3400 - Water Resources

Credits: 3
Prerequisite(s): ~~MTH 1108 or MTH 1110 or MTH 1112; ENV 1200 or GEG 1100; Completion of General Studies~~ ENV 1200 or GEG 1100 or GEG 1910 or MTR 1400 or MTR 1600 or GEL 1150 or GEL 1010
Description: This course presents an analysis of water as a major resource. It includes the study of the hydrologic cycle, competing water uses, current water problems, and approaches to water management. The relationship of water to land use is examined in terms of dams, watersheds, water laws, pollution, and flood control. Topics introduced in this class include hydrology, hydrogeology, water quality analysis, water treatment, wastewater treatment, and both U.S. and international water resource management.

(M) FIN 4810 - Affordable Housing Finance ~~and Development~~

Credits: 3
Prerequisite(s): REL 2400
Description: In this course, students will explore the intricacies of financing affordable housing properties. Students will examine public sector funding sources, providers of private-sector debt, as well as equity in the form of Low Income Housing Tax Credits. They will also gain practical insights into the elements of a multifamily affordable housing development *pro forma*, as well as developing a *pro forma* using information provided.

(M) GIS 3250 - Cartography

Credits: 3
Prerequisite(s): GIS 2250 ~~and MTH 1210~~ with grade~~s~~ of "C-" or better; or permission of instructor
Description: This course focuses on basic cartographic and visualization concepts and techniques to convey spatial information. Students will critique and design basic cartographic products such as dot, choropleth, contour, and proportional symbol maps using Geographic Information Systems (GIS). They will explore advanced visualization techniques such as integrating data, text, and graphics, developing web maps, and animating maps to show temporal change. Cartographic applications for natural resource management and planning are stressed.

Course Descriptions (Graduate)

(N) BI 5010 - Business and Economics for Professionals

Credits: 3
Description: In this course, students gain essential knowledge in economics and business, analyzing consumer and producer decision-making, interpreting economic indicators like GDP, inflation, and unemployment, and understanding key business functions and strategic planning. Students learn to interpret financial statements, apply basic accounting principles, and use financial analysis techniques. They also explore marketing concepts, conduct market research, examine consumer behavior, and study organizational behavior, with a focus on leadership and team dynamics.

(N) BI 5050 - Programming and Spreadsheet Modelling

Credits: 3
Description: In this course, students build essential programming skills and master advanced spreadsheet techniques for real-world business applications. Beginning with core programming concepts such as variables, conditionals, loops, and functions, students learn data manipulation within spreadsheets. They explore data wrangling, pivot tables, queries, and analytical tools, gaining hands-on experience with arrays, objects, forms, error handling, and external data management. Through practical applications, students create data models and generate detailed reports. By the course's end, students are proficient in using spreadsheets to analyze data, solve business challenges, and present actionable insights.

(N) BI 5060 - Database Management and Warehousing

Credits: 3
Prerequisite(s): BI 5050
Description: In this course, students learn both foundational and advanced database concepts, from design to management. They start by creating database designs from user requirements and implementing them with up-to-date database tool(s). Key topics include distributed database management, concurrency control, data warehousing, and data mining. As students advance, they develop skills in complex SQL queries and use PL/SQL for building end-user applications. Hands-on experience includes designing, developing, and prototyping functional applications, equipping students with practical skills for real-world database management.

(N) BI 5100 - Data Visualization and Dashboard Design

Credits: 3
Prerequisite(s): BI 5010, BI 5050, MBA 5210
Description: In this course, students develop comprehensive data visualization skills to analyze and communicate insights effectively. They learn to map data to visuals using best practices, assess coordinate systems, scales, and visual encodings for various data types. The course covers techniques for creating statistical graphics that represent distributions, proportions, and hierarchical data. Students also explore principles of figure design, visual perception, and avoiding misleading visuals, along with crafting

compelling narratives and dashboard presentations that meet audience needs and address business challenges.

(N) BI 5400 - Generative AI for Businesses

Credits: 3
Prerequisite(s): BI 5100, MBA 5220
Description: In this course, graduate Business Intelligence students explore core concepts and applications of Generative AI in business. They learn the basics of the technology, assess its impact on business operations, and evaluate its advantages and limitations. Students discover how Generative AI can enhance business strategies and, through hands-on exercises, build models to apply Generative AI in real-world business scenarios.

(N) BI 5450 - Data Governance, Security and Ethics

Credits: 3
Prerequisite(s): BI 5060, BI 5100, MBA 5220
Description: In this course, students explore critical areas of data governance, security, and ethics essential for modern organizations. They learn the importance of responsible data management, covering core principles of data governance. Key topics include data security and privacy, ethical considerations in data use, and practical applications of data ethics. The course also addresses data ownership, rights, and emerging issues. Students develop skills to effectively communicate best data practices within their organizations, fostering a culture of data integrity and security.

(N) BI 5900 - Integrated Business Intelligence Projects

Credits: 3
Prerequisite(s): BI 5100, MBA 5220, MBA 5230
Corequisite(s): BI 5400, BI 5450
Description: In the Integrated Business Intelligence Capstone, students engage in a project-based experience, applying business intelligence techniques to solve complex, real-world business challenges. The course begins with a review of essential BI concepts and progresses to hands-on dataset preparation for analysis. Students first tackle individual analyses of complex business problems before moving into team-based projects. The course culminates in a professional presentation of findings to a panel of academic and industry experts.