MAYO GRADUATE SCHOOL (MGS)

MGS 5000 Foundational Skills (1 Credit)
K. Knoop (Summer) – This required course will introduce students to core professional competencies necessary for success in graduate school and beyond. Topics will include, but are not limited to personal and professional growth, mentorship, communication, goal setting, and career development. This course is for MCGSBS PhD and MD-PhD learners.
Grading: Sat / Unsat, Test-Out/Waivers

MGS 5010 Rigor, Reproducibility, Experimental Design, and Data Management (1 Credit)
C. Sussman (Summer) - This course will explore the critical principles of experimental design, rigor, reproducibility, and data management in modern scientific research. Through lectures and case studies, students will master hypothesis formulation, basic statistical considerations, bias reduction techniques, and ethical research practices. Students will examine the reproducibility crisis, open science initiatives, and the importance of data sharing. Lecture topics will provide practical insights into real-world challenges, empowering students to enhance the quality and impact of their own research. By the end of the course, learners will possess the skills to implement rigorous experimental design strategies and contribute to a culture of transparency and excellence in biomedical sciences.
Grading: Sat / Unsat, Test-Out/Waivers

MGS 5030 Core Concepts in Genome Dynamics, Biochemistry, Cellular Biology, and Physiology (3 Credits)
M. Weivoda, M. Schellenberg (Summer) - This course highlights the key concepts in genome structure and function, biomacromolecular structure and function, the central principles governing cell biology, and human physiology. Through lectures, small group discussions, and group assignments, the course builds on foundational concepts of molecular mechanisms. Students will be expected to complete weekly knowledge checks and a final group presentation ensure continuous engagement and assessment of students' grasp of the material. This course is only for MCGSBS PhD and MD-PhD learners. Others learners should enroll in MGS 5031.
Grading: Standard Letter, Test-Out/Waivers

MGS 5031 Fundamental Principles in Genome Dynamics, Biochemistry, and Cellular Biology (3 Credits)
M. Schellenberg, M. Weivoda (Summer) – This course provides a survey of the fundamental principles in genome structure and function, biomacromolecular structure and function, and the central principles governing cell biology. Through asynchronous delivery methods, the course provides an overview of the concepts of molecular mechanisms. For this course, students will be expected to complete weekly knowledge checks and exams. This course is intended for masters, certificate, and non-degree candidate learners. PhD students should enroll in MGS 5030.
Grading: Sat / Unsat

MGS 5050 Critical Thinking and Scientific Writing (2 Credits)
L. Lujan, P. McLean (Summer) – This course is intended for graduate students across all tracks who have selected their thesis mentor and are beginning their second year. The course will involve two components. The first will be a didactic element that introduces funding mechanisms, grant components, communication skills, rigor and reproducibility, and data analyses. In parallel, students will choose a topic of interest and prepare the specific aims page of an NIH style small grant proposal (F-style training grant). Via a series of weekly roundtable forums discussing the merits and faults of each specific aims page throughout the writing process, the students will learn to craft a coherent and well-reasoned specific aims page of an NIH style grant. Course previously listed as CORE 6050.
Grading: Sat / Unsat, Test-Out/Waivers

MGS 5051 Critical Thinking and Scientific Writing, Part II (1 Credit)
J.L. Lujan, P. McLean (Fall) – This course is intended for second-year graduate students across all tracks. The course will involve preparing an NIH style small grant proposal (e.g. 6-12 page F31 format) that will be critiqued by the course directors, the instructors, and by the other students in the class in a “study section” setting. Students will base this proposal on the specific aims page developed during MGS 5050 or will choose a new topic of interest. Via a series of weekly roundtable forums discussing the merits and faults of each proposal throughout the writing process, the students will learn to craft a coherent and well-reasoned grant. Course previously listed as CORE 6051.
Prerequisites: (MGS 5050, or CORE 6050, or MDPH 5150)
Grading: Sat / Unsat, Test-Out/Waivers

MGS 5100 SURF Rotation and Seminar Series (2 Credits)
During this 10-week fellowship students will attend a weekly SURF seminar, other seminars and journal clubs within Mayo Graduate School and present at an end-of-the year event hosted by their program. Students will receive hands-on research training during the 10-week full-time fellowship.
Grading: Sat / Unsat

MGS 5101 Ph.D. Optional Lab Rotation (2 Credits)
TBA (Fall, Winter, Spring, Summer) – Laboratory rotation (4 weeks) under supervision of staff. This is used for 4th and 5th rotations only. Requires Academic Affairs Committee approval prior to registration. Available to PhD, MDPhD, and CARE PhD students.
Grading: Sat / Unsat

MGS 5102 Ph.D. Laboratory Rotation (2 Credits)
TBA (Fall, Winter, Spring, Summer) – First laboratory rotation under supervision of staff.
Grading: Sat / Unsat, Test-Out/Waivers

MGS 5104 Lab Rotation Waiver (2 Credits)
TBA (Fall, Winter, Spring, Summer) – PostBac, Master’s, PREP, GREP and other similar lab experiences.
Grading: Sat / Unsat, Test-Out/Waivers

MGS 5105 CARE Ph.D. Laboratory Rotation (1 Credit)
L. Griffiths (Fall, Winter, Spring, Summer) – First CARE PhD laboratory rotation. The CARE PhD rotation provides an opportunity for students to interact with research faculty in their area of interest. This rotation experience should help CARE Ph.D. students confirm their mentor as well as identify ideal faculty for their thesis advisory committee. Only faculty with full graduate faculty privileges are eligible to host a student lab rotation and be chosen as a thesis mentor. Each CARE Ph.D. student must complete two lab rotations in two different laboratories (one credit each) for a total of two credits. A third rotation may be completed but is considered optional.
Grading: Sat / Unsat

MGS 5106 CARE Ph.D. Laboratory Rotation (1 Credit)
L. Griffiths (Fall, Winter, Spring, Summer) – Second CARE PhD laboratory rotation. The CARE PhD rotation provides an opportunity for students to interact with research faculty in their area of interest. This rotation experience should help CARE PhD students confirm their mentor as well as identify ideal faculty for their thesis advisory committee. Only faculty with full graduate faculty privileges are eligible to host a student lab rotation and be chosen as a thesis mentor. Each CARE Ph.D. student must complete two lab rotations in two different laboratories (one credit each) for a total of two credits. A third rotation may be completed but is considered optional.
Grading: Sat / Unsat

MGS 5107 Ph.D. Laboratory Rotation (2 Credits)
TBA (Fall, Winter, Spring, Summer) – Second laboratory rotation (6 weeks) under supervision of staff.
Grading: Sat / Unsat

MGS 5108 Ph.D. Laboratory Rotation (2 Credits)
TBA (Fall, Winter, Spring, Summer) – Third laboratory rotation (6 weeks) under supervision of staff.
Grading: Sat / Unsat

MGS 5109 Foundations in Leadership (1 Credit)
M. Walther-Antonio (993: Fall, Winter, Spring) – This course will teach about leadership principles for biomedical scientists, including communication styles, resilience, and emotional intelligence. Students will be expected to demonstrate an understanding of these topics and apply course concepts to complex case studies as well as their own personal circumstances. The course is intended for PhD students in biomedical sciences, but is open to all students.
Grading: Sat / Unsat

MGS 5110 Leadership Discussion Topics and Coaching (1 Credit)
M. Walther-Antonio (Fall, Winter, Spring) – This course will expand upon the principles taught in MGS 5100 Foundations in Leadership for Biomedical Scientists course. Students will be required to participate in group discussions and individual coaching sessions that build on the topics taught in MGS 5109. The course is intended for PhD students in biomedical sciences, specifically those admitted to the LeaP program.
Prerequisites: MGS 5109 may be taken concurrently
Grading: Sat / Unsat

MGS 5120 Leadership Preparation (1 Credit)
M. Walther-Antonio (Fall, Winter, Spring) – In this course, students will construct a project proposal, either independently or in a small group. Students will learn about the important components of project proposals through didactic course lectures. The course is intended for PhD students in biomedical sciences, specifically those admitted to the LeaP program.
Prerequisites: MGS 5109 may be taken concurrently, and MGS 5110 may be taken concurrently
Grading: Sat / Unsat

MGS 5130 Leadership in Action (1 Credit)
M. Walther-Antonio (Fall, Winter, Spring) – In this course, students will construct a project proposal, either independently or in a small group. Students will learn about the important components of project proposals through didactic course lectures. The course is intended for PhD students in biomedical sciences, specifically those admitted to the LeaP program.
Prerequisites: MGS 5109 may be taken concurrently, and MGS 5110 may be taken concurrently, and MGS 5120 may be taken concurrently
Grading: Sat / Unsat

MGS 5140 Extended Leadership (1 Credit)
M. Walther-Antonio (993: Fall, Winter, Spring) - In this course, students will continue to put their leadership skills into practice. Students will continue experiential opportunities from MGS 5130. Leadership experiences will be shared with other LeaP cohorts for collaboration opportunities. As leaders, students will learn to manage a team and delegate tasks. Students will relate their leadership experience to their personal areas for growth and goals around leadership skill development. The course is intended for PhD students in biomedical sciences, specifically those admitted to the LeaP program.
Prerequisites: (MGS 5109, and MGS 5110, and MGS 5120, and MGS 5130)
Grading: Sat / Unsat

MGS 5200 Career Development Internship (CDI) (3 Credits)
J. Ross (Fall, Winter, Spring, Summer) – Career Development Internships (CDIs) are opportunities for upper-level PhD students to spend 80 or more hours as interns in the areas described within the MCGSBS Career and Professional Development Framework. CDIs allow MCGSBS students to explore possible interests, network with professionals, and develop an understanding of career options. The goal of the CDI program is to provide learners with hands-on experiences in diverse career environments both internally and externally to assist with making informed career path decisions. Prerequisites: Completion of oral and written qualifying examinations. Completion of appropriate CDI paperwork. Course director approval required for registration.
Grading: Sat / Unsat

MGS 5500 Belonging in the Biomedical Community (1 Credit)
TBA (Fall, Winter) – A sense of belonging to the scientific community provides increased wellbeing, fulfilment, and partnership, ultimately leading to the learner's success. This course will provide the opportunity for students to volunteer within the Mayo Clinic surrounding communities across all campuses. Students will engage in local volunteering activities available through the Mayo Clinic CARES platform as well as participating in classroom activities that cover topics such as collaboration, interpersonal skills, ethics and values, leadership, and community engagement. The course will be conducted over 2 quarters, culminating in the presentation of the students' gained experiences. Students are required to attend scheduled class sessions and participate in at least 4 hours of volunteering per month.
Grading: Sat / Unsat

MGS 6000 Responsible Conduct of Research (1 Credit)
R. Sharp (Summer, Winter) – This course aims to provide instruction on the responsible conduct of research (RCR) and is an NIH requirement. The course is designed to provide learners with key fundamental principles and best practices surrounding RCR and to set the tone for future generations of researchers. MGS 6000 will be delivered in a blended format of online and face-to-face discussions (as conditions allow). The course consists of 10 key topics delivered in 10 didactic style lectures. For each lecture/topic there will be a short quiz and online discussion post that will be required. Topics include research misconduct, responsible data management, public responsibilities with scientists, scientific authorship and publication, peer review, ethical use of animal research and human research, mentor/mentee responsibilities, and research collaboration with industry. Course previously listed as CORE 6000.
Grading: Sat / Unsat

MGS 6001 Responsible Conduct of Research Refresher Course (0 Credits)
R. Sharp (Winter, Summer) – The NIH requires Responsible Conduct of Research (RCR) instruction at least once during each career stage, and at a frequency of no less than once every four years. The RCR Refresher Course consists of eight hours of instruction within MGS 6000. Ph.D. and M.D-Ph.D. students will be notified by MCGSBS when they are required to take the refresher course. Course previously listed as CORE 6001.
Prerequisites: (MGS 6000, or CORE 6000)
Grading: Sat / Unsat

MGS 6010 Rigor and Reproducibility (0 Credits)
C. Sussman (Fall) – This course will focus on key concepts in scientific rigor and reproducibility. MGS 6010 curriculum will be delivered in an asynchronous format.
Grading: Sat / Unsat

MGS 6100 Master's Thesis Proposal (3 Credits)
TBA (Fall, Winter, Spring, Summer) – For MCGSBS Master's students only. Register during the quarter of which the thesis protocol is approved. May be taken only once for credit. Register with program director as course director.
Grading: Sat / Unsat

MGS 6400 Master's Capstone Project (6 Credits)
TBA (Fall, Winter, Spring, Summer) – This culminating course is required for all students in the Professional Master's Program and serves as the final academic milestone of the degree. Students will complete a scholarly capstone project that demonstrates mastery of their chosen track and area of interest. Projects may take the form of a critical review article, original research manuscript, case study, or another approved scholarly product suitable for presentation or publication. Students must register for MGS 6400 during their final quarter in the program. The course may only be taken once for credit. Students must register with the Program Director for their track as the course director.
Grading: Sat / Unsat

MGS 6840 Master's Research (4 Credits)
TBA (Fall, Winter, Spring, Summer) – For Basic Science Master's Program Student's only. Graduate research for Master's students under supervision of staff. Register with mentor as course director. 4 cr/qtr – 4 qtrs required.
Grading: Sat / Unsat

MGS 6890 Predoctoral Research (3 Credits)
TBA (Summer, Fall, Winter, Spring) Graduate thesis research for Ph.D. students under directed supervision of a faculty mentor. Student must enroll every quarter once a mentor/thesis laboratory is selected for remainder of program. Register with mentor as course director. If your instructor is not listed for MGS 6890, please contact the Registrar's Office at comregistrar@mayo.edu. 3 cr/qtr – 8 qtrs (minimum 24 credits required)
Grading: Sat / Unsat

MGS 6900 MGS General Elective (1-34 Credits)
This course is for documentation of transfer credits. Students cannot directly register for this course. Please refer to the Credit Conversion, Transfer, Waiver, and Substitution Policy and Procedure to determine if you are eligible for transfer credits.
Grading: Transfer Courses