**Handbook**

**for the**

**Master of Science**

**in**

**Health Sciences**

**West Virginia University**

**Health Science Center**

**May, 2020**

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I. **GOALS AND OBJECTIVES OF THE PROGRAM**

The M.S. program is a terminal degree program targeting students interested in developing their skills toward a career requiring basic science knowledge. The objectives of this program are to:

1. provide integrative scientific education in the biomedical and public health sciences to graduates from an accredited undergraduate institution
2. provide the opportunity to explore career options in various health professional disciplines
3. develop integrative and critical thinking skills to allow application of scientific knowledge to traditionally non-scientific fields
4. train students in the rudiments of research on a basic science, public health or clinical topic; these include hypothesis testing, data collection, manuscript preparation
5. enhance competitiveness for admission to a health professional and/or Ph.D. program
6. enhance skills for job placement including resume and cover letter evaluation, and interviewing preparation

To achieve these objectives, our program proposes two areas of emphasis: (1) advancement of basic science and public health knowledge for career enhancement and (2) partnering basic science with other disciplines. In the first area of emphasis, students will augment their scientific skills with advanced coursework emphasizing critical thinking and application of that knowledge to problems facing human health. This area targets students interested in pursuing professional or advanced academic degrees. In the second area of emphasis, the students can expand their knowledge to allow them to direct a non-scientific career toward one that relies on a scientific skill set. Students in this area of emphasis may be teachers wishing to teach science in secondary schools, individuals interested in eventually achieving other professional degrees such as a J.D. or M.B.A. to pursue patent law or a position in a biotech/pharmaceutical company, or positions as a scientific liaison translating scientific knowledge to the general public in a community organization or a for- profit company, a position sometimes called a knowledge broker.

Proposed coursework is designed to build the foundation knowledge common to first-year curricula in medical, dental and allied health schools and biomedical and public health Ph.D. programs. The common core curriculum will include coursework in the basic and public health sciences, biostatistics, epidemiology, and social and behavioral theory. In addition to coursework, students will participate in a series of activities including:

-Participation in an independent study research project with a faculty mentor of your choice

-Training in reading and evaluation of the scientific literature

-Enhancement of career development skills, be it preparation to take entrance exams, preparation of resumes and cover letters, and/or interviewing skills

-Participation in seminars to learn cutting edge advancements in science

-Cross-disciplinary approach to the acquiring and application of scientific knowledge

-Participation in career development activities such as shadowing and community service

In addition to the information contained in this handbook, the student is urged to also consult the current Graduate School Catalog for additional information regarding the requirements of the Graduate Council at West Virginia University. <http://catalog.wvu.edu/graduate/schoolofmedicine/healthsciences/>

**II. ADMISSION INTO THE M.S. Program**

Prospective students must have an earned bachelor’s degree from an accredited university with an overall GPA of at least 3.0 and should have satisfactorily (grade of "C" or above) completed all recommended prerequisites:

1. Biology or related coursework – 1 year
2. Chemistry – 2 years
3. Physics – 1 year
4. Math through Calculus
5. Coursework in the Social or Behavioral Sciences and English
6. Undergraduate coursework in Biochemistry and Physiology

Students can request admission beginning with either the Summer semester or Fall session. Students starting with summer session (May) can complete the degree by the end of the spring semester. Students starting in the Fall semester can complete the degree by the end of summer session.

Applicants must complete the Hobson’s online application and submit the following:

* + - 1. official transcripts from all undergraduate and graduate institutions attended,
			2. official GRE, MCAT, or DAT scores not required
			3. TOEFL scores, if applicable
			4. personal statement describing the applicant's reasons for pursuing a career in science or the application of science to another career, and describe any relevant clinical, community service or research experience
			5. resume
			6. three letters of recommendation

Under certain circumstances, the admissions committee may waive the GPA requirement.

Applicants will be evaluated for acceptance into this program by an Admissions Committee composed of the following individuals: Program Director – biomedical scientist, Assistant Vice President for Health Sciences Graduate Education (or appointee), representatives from the Schools of Medicine, Public Health, and Dentistry, and the Director of the Health Careers Opportunity Program. Review of applications will begin in January and proceed until all slots are filled, or suitable candidates have been identified. Applicants may be asked to interview with members of the Admissions Committee.

Note: Students considered for admission must demonstrate the intent, passion, drive, and potential for a career in the health professions, academics, research, or other science related career. A goal is to place all graduates in rewarding career positions, and it is imperative that only students with excellent career prospects are admitted.

**III. PROGRAM ACTIVITIES**

 **A. Curriculum**

Degree Requirements and Course Credit Limitations

Students in a master’s program must complete a minimum of 37 total credits. Of this, six credits are composed of Independent Study.

Credit toward a MS graduate degree may be obtained only for **courses listed in the graduate catalog and numbered 400–799**. No more than forty percent of course credits counted toward any graduate degree may be at the 400-level. No residence credit is allowed for special field assignments or other work taken off the WVU campus without prior approval. Graduate credit is obtained only for courses in which the grade earned is A, B, or C. Courses taken as audits or courses in which the grade earned is F or U may not count toward a graduate degree.

 **A.1. Core Curriculum**

The following courses provide the core knowledge recommended for all students. Students with demonstrated ability in one or more of these courses may substitute an elective with permission from the academic mentor. AGBI410 (Agricultural Biochemistry) or AGBI610 or AGBI512/513 can be substituted based on recommendation of the graduate director. Students interested in dental school may take PSIO441 instead of PSIO743.

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| **MS in Health Science Courses** | **Code** | **Credits** | **Summer start**  | **Fall start**  |
| Independent Study | BMS 695 | 2 | Summer | - |
| Professionalism in Health Care | BMS 685 | 2 | Summer | - |
| *Elective* |  | 3 | Summer  | - |
|  |  |  |  |  |
| Fundamentals of Physiology | PSIO 743 | 5 | Fall | Fall |
| Public Health Epidemiology | EPID 601 | 3 | Fall | Fall |
| Applied Biostatistics | BIOS 601 | 4 | Fall | Fall |
| Seminar/Journal Club | BMS 684 | 1 | Fall | Fall |
| Independent Study | BMS 695 | 2 | Fall | Fall |
|  |  |  |  |  |
| General Biochemistry or Applied Pharmacology | BIOC 531PCOL 549 | 44 | SpringSpring | SpringSpring |
| Social & Behavioral Theory | SBHS 601 | 3 | Spring | Spring |
| *Elective*  |  | 3 | Spring | Spring |
| *Elective* |  | 3 | Spring | Spring |
| Independent Study | BMS 695 | 2 | Spring | Spring |
|  |  |  |  |  |
| Independent Study | BMS 695 | 2 | - | Summer |
| Professionalism in Health Care | BMS 685 | 2 | - | Summer |
| *Elective* |  | 3 |  | Summer |
|  |  |  |  |  |
| Total Course Credits |  | 31 |  |  |
| Independent Study Credits |  | 6 |  |  |
| Total Program Credits  |  | 37 |  |  |

**A.2. Examples of Spring Electives: may change in spring and summer**

|  |  |  |  |
| --- | --- | --- | --- |
| **Courses** | **Code** | **Credits** | **Semester** |
| Applied Biostatistics 2 | BIOS 603 | 3 | Spring |
| Applied Healthcare Leadership | HPML 791 | 3 | Spring |
| Clinical Research Methods | PUBH 662 | 3 | Spring |
| Environmental Health | OEHS 601 | 3 | Spring |
| Healthcare and Insurance: Medicaid, Medicare andthe Affordable Care Act | HPML 675 | 3 | Spring |
| Immunology & Biotechnology | PHAR 709 | 3 | Spring |
| Microbial Pathogenesis | MICB 784 | 4 | Spring |
| Molecular Diagnosis in Public Health | OEHS 770 | 3 | Spring |
| Patient Reported Outcomes | PHAR 757 | 3 | Spring |
| Principles of Clinical Trials | EPID 625 | 3 | Spring |
| Public Health Toxicology | OEHS 622 | 3 | Spring |
| Introduction to Research | EDP 612 | 3 | Summer |
| Public Mental Health | PUBH 586 | 3 | Summer |
| Introduction to Global Public Health | PUBH 605 | 3 | Summer |
| Disability in the Community | DISB 482 | 3 | Summer |
| Molecular Biology of Cancer | BIOL 426 | 3 | Summer |
| Contemporary Issues in Aging | SOWK 572 | 3 | Summer |

**A.3. BMS684 Journal Club/Seminar**

 Graduate students in the Master of Science in Health Sciences program take this course. The course is designed to introduce graduate students to current topics in healthcare industry and biomedical sciences. Students will critically read and interpret the literature over a broad range of topics related to evidence based medicine and clinical and translational research. They will also attend seminars at the medical center on a regular basis. All students will be expected to reflect on the seminars by journaling on SOLE to develop their writing skills. The course will provide opportunities for students to develop skills in public speaking by presenting a 3-minute elevator speech on their Independent Study project.

Participation in Journal Club/Seminar is mandatory. If you miss a class for any reason, you must be excused by the faculty coordinator. This can be done by personally emailing or calling the faculty coordinator prior to the date. More than 3 unexcused absences will result in a drop of grade. An unexcused absence is one in which you simply do not attend class and fail to inform the faculty coordinator prior to the absence. Excused absences will result in your needing to make-up the missed work. This will involve writing a 1-page summary of the paper. More than one excused absence may affect your grade as well.

**A.4. BMS685** **Professionalism in Health Care**

Graduate students in the Master of Science in Health Sciences program take this course. The course is designed to review the key elements of professionalism that are required for career success in a medical profession. Students will discuss the importance of relationships, fostering teamwork and good communication skills. The course will provide opportunities for students to explore best practices that apply to all health care workers. Beyond the course material, students will engage in team-based learning to create a work group environment that simulates practice environments.

Attendance at class as stated in the syllabus is mandatory. If you must miss for any reason, you must be excused by the faculty coordinator. This can be done by you personally emailing or calling the faculty coordinator prior to class. More than 3 unexcused absence will result in a drop of grade. An unexcused absence is one in which you simply do not attend class and fail to contact anyone. Excused absences will result in your needing to make-up the missed work. This will involve writing a 1-page summary of the work missed. More than one excused absence may affect your grade as well.

**A.5. Training in Ethics**

 All students will be required to complete the online course in scientific ethics developed by CITI and available on the website for the WVU Office of Research Integrity. In addition to the core module in this training, students will also complete the optional module on plagiarism.

**A.6. BMS695 Independent Study**

 Each student will also design and carry out an independent research project under the guidance of his/her faculty mentor. The topic of the project should align with career interests. Examples can be found in appendix A. The project should conducted for 3 consecutive semesters. During the final semester, each student will present their project orally (12-min talk, 3-min for questions) to the other students and faculty in the program.

**B. Summer Skill Development Activities:**

 Summer semester activities will involve choices of career development activities extending over a 12-week period. Activities 1-3 listed below are on-line and self-paced. Activities 4-5 are conducted at the HSC.

1. MCAT, DAT, or GRE pre-tests are offered to help identify areas of deficiency

2. Formal MCAT or DAT preparation with targeted remediation are offered, using one of the currently available on-line courses offered by Gold Standard or Kaplan. Remediation will involve repeating the relevant portions of the test preparation course, and, for those students taking the MCAT. Tutors will be made available to students.

 *Note 1: In 2015, the MCAT changed to incorporate more questions pertinent to biochemistry (less organic chemistry), biostatistics, psychology, and cultural sociology. In fact, for the MCATs a fourth category will be added – psychosocial sciences – along with verbal, physical sciences, and biological sciences. With these changes in the MCAT format, options for remediation will change accordingly.*

 *Note 2: The student will be responsible for half the cost of the commercial test preparation course, with the other half paid for by the Program.*

3. Opportunities for shadowing of health care providers, facilitated by HSC faculty, will be offered to students. For students interested in medical or dental school, shadowing opportunities and trips to the gross anatomy lab can be arranged and tailored to the interests of the student where possible.

4. For students starting with summer session, this is an ideal time to take elective courses.

5. Summer is a good time to participate in Community Service (program requirement 20 hours minimum).

**IV. ACADEMIC AND PROFESSIONAL STANDARDS**

 **A. Grades**

 To remain in good standing in the program, a student is required to maintain the following standards:

a. An overall grade point average of 3.0 is required for all graduate level coursework. Letter grades for courses are ABC and F. Courses taken as audits or courses in which the grade earned is D or F will not count toward a graduate degree.

b. Removal of any incomplete grades within one semester or summer session of their award, unless special permission is granted by the Program Director.

c. BMS695 Independent Study will be given as letter grades. The student should consult the course syllabus. A grade of D or F in BMS695 will result in the student being placed on probation. A second D or F will result in dismissal from the program.

d. An incomplete grade must be removed within one semester or summer session of their posting.

Failure to comply with these standards will result in the student being placed on academic probation and may result in dismissal from the graduate program. Withdrawal from courses due to a low grade regardless of the overall GPA at the end of the semester, will be considered a violation of academic standards and may result in probation. For students already on probation, it will be considered a failure to meet the terms of the probation. All course work must be completed with a minimum grade-point average of 3.0 in order to graduate.

 **B. Student Code of Academic and Professional Integrity**

 Graduate students in the MS in Health Sciences are expected to adhere to the following standards of behavior throughout their tenure in graduate school. This code governs student behavior in classrooms, research endeavors, academic and professional gatherings and travel, and in their daily conduct outside of the University. In addition to the code outlined below, all students will uphold the WVU Student Conduct and Discipline Policy. This code can be found at https://studentconduct.wvu.edu/

1. Academic Integrity

Students will:

* not plagiarize the work of others either by directly copying that work or by summarizing the thoughts of others as their own;
* not cheat on any examinations, on academic assignments and activities, and will not provide unauthorized help to others during an examination or graded academic assignment;
* not alter examination scores, answer sheets, other graded materials, or their academic record;
* adhere to the University policies on academic integrity http://catalog.wvu.edu/graduate/enrollmentandregistration/#academicdishonestytext

2. Scientific Integrity

Students will:

* have actually carried out experiments as reported;
* represent their best understanding of their work in their descriptions and analyses of it;
* accurately describe methods used in experiments;
* not report the work of others as if it were their own;
* in their publications adequately summarize previous relevant work;
* when acting as reviewers will treat submitted manuscripts and grant applications confidentially and avoid inappropriate use; and
* disclose financial and other interests that might present a conflict-of-interest in their various activities such as reporting research results, serving as reviewers, and mentoring students;
* adhere to the University Research Integrity Procedures that can be viewed at: https://oric.research.wvu.edu/general-guidance/academic-integrity

3. Scientific citizenship

Students will:

* strive to provide timely, efficient and high-quality work;
* function as an effective and respectful team member in the performance of collaborative research;
* strive to always acknowledge the contributions of their co-workers;
* strive to keep all work areas clean, organized, and conducive to high-quality research;
* respect shared work areas and reagents and insure that steps are taken to replenish reagents when they are in low supply;
* refrain from activities that might be disruptive to the work of others, including playing music, conversation, telephone calls
* be attentive in presentations by their colleagues and provide constructive criticism as appropriate;
* seek and accept criticism without reprisal or defensiveness;
* strive to address and remedy situations as they arise and to follow through on all promises and commitments to co-workers;
* wear appropriate clothing in the laboratory and other research settings that is consistent with federal, state, and University regulations;
* speak-up and report any practice, condition, or situation, that may cause harm or that is against federal, state, and University regulations;
* when traveling as a representative of the University and laboratory, the student will behave in a professional manner, uphold the rules of the laboratory with respect to the sharing of data, report expenses in a truthful manner, and refrain from frivolous use of travel funds for meals or modes of transportation that are unnecessary.

4. Professional interactions

Students will:

* strive to increase their knowledge and expertise in order to maintain qualifications consistent with the highest standards available in their discipline;
* accept and adapt to the continual change inherent in the creation and delivery of knowledge;
* be appropriate in dress, language and demeanor at all time and avoid language and dress that is offensive to others;
* respect and protect all students’, staff, faculty, study participants’, and patient’s rights to privacy and confidentiality;
* minimize personal text messaging, e-mailing, telephone calls, and social media while at work;
* respond to all communications in a timely manner;
* listen carefully and to be thoughtful and respectful in all forms of communication and during the attendance of seminars;
* provide training and experience to advance the scientific skills and knowledge of ethical research practices for any trainee under their supervision;
* treat all individuals in a caring, respectful, professional, and empathetic manner.

**C. Evaluation of Student’s Progress**

 Student progress is reviewed twice per year by the Graduate Programs Committee on Academic and Professional Standards (GP-CAPS). This committee considers all the information listed above under academics and professionalism.

 C.1. GP-CAPS Membership

 This committee has representatives from all 7 Biomedical PhD programs and the clinical and translational science graduate programs.

 C.2. Student Review and Appeals Policy

 Students have the right to due process in all decisions regarding their grades, evaluations, and status in graduate school. The procedure for student review can be found on the Research and Graduate Education website (http://www.hsc.wvu.edu/resoff/graduate-education/policies-and-forms/). The procedure for appeals can be found in the graduate catalog. Students desiring to appeal a grade or other decision on their academic status are advised to meet with the Assistant Vice President for Graduate Education to review these procedures before beginning the process. You should familiarize yourself with this policy before you need to use it.

 **D. Vacations, Sick Leave, and Work Schedules**

 The students will adhere to the University calendar and break schedule for their coursework. Because the independent study project is ongoing throughout the year, the student should expect to spend the breaks between the fall and spring semester and the spring semester and summer session, to move this project forward.

There is no plan for sick leave for students. Students who are sick will need to inform course faculty of this and arrange to get notes and make up the work. Any policies that instructors have for absences from their courses will apply to the students in this program. The student is cautioned that the degree is granted based on completion of all components and thus frequent absences can jeopardize the completion of the independent study project. As part of the student’s professional training, they are advised to adopt habits that promote health, such as proper nutrition, hygiene, regular exercise, and sufficient sleep.

Students who need an extended absence (greater than 1 week) from the program due to illness, pregnancy, or personal issues will need to request a formal leave of absence from the program. The University and Health Sciences Center Guidelines need to be followed to apply for this.

**V. INDEPENDENT STUDY MENTORS**

 **A. Selection of mentors for Independent Study projects**

 Admitted students will select a faculty mentor based on their research and clinical interests. The mentor will guide the independent study project and provide evaluations of the student progress and behavior each semester to the Director of the MS program or designee (academic mentor).

 **B. Schedule for Meetings with Mentors**

Students should meet face to face with their mentors at least every other week and by email between then. The mentor should be informed of progress on Independent Study and intended or unintended absence.

**VI. COMPLETION OF THE DEGREE**

**A. Timetable for Completion (from the University Catalog)**

 *Completion of the M.S. degree is realized when the student has fulfilled all course requirements and the independent study project.*

Master’s degree students are permitted to continue in a program for a maximum of eight years under their original application. Students who have been inactive for two or more years, or who do not enroll for one year after initial admission, are required to apply for, and be accepted for readmission. The application fee is assessed for reapplication. Graduate work planned with the Program Director (e.g., plan of study) must be satisfactorily completed within a period of eight years immediately preceding the conferring of the degree. A course taken more than eight years previously must be revalidated if it is to be used towards meeting degree requirements. Revalidation can be accomplished by submitting the following information for approval to the Office of Graduate Education and Life:

* A letter from the course instructor listing the criteria used to revalidate the course material
* A copy of the student’s performance on the student’s revalidation examination
* A letter from the college/school graduate coordinator and/or dean supporting the revalidation

 **B. Admission to Graduate and Professional Degree Programs**

 The MS in Health Sciences degree is designed to enhance the student’s competitiveness and preparedness for admission to advanced degree programs. Students are encouraged to discuss this thoroughly with their Program Director. Completion of the MS in Health Sciences degree does not guarantee an interview or admission to any program or attainment of any position.

Appendix A. Examples of Independent Study Projects

The independent study project involves 6 credits of the core curriculum and will be a research project involving either bench science, clinical research or population/public health research. The project will be conducted with one of the mentors or heavily supervised by the mentor. The outcomes will be summarized in manuscript format as well as presented orally. Examples of potential projects are:

1. Testing of a hypothesis in a research laboratory. This is not unlike experiences that we already offer to first year basic science graduate student in the form of laboratory rotations or undergraduates taking research credits.

2. Retrospective analysis of clinical outcomes. Such projects are routinely done by medical students as research rotations or summer activities.

3. Testing of a hypothesis using existing community interventions. We have a number of projects in the HSC that involve interacting with groups in the community for specific health related interventions.

4. Secondary analysis of a national database, e.g., NHANES.

5. Participation in data management for an existing clinical or community study, e.g., the CARDIAC project.

**Signature Page**

I have read and understand the Handbook of the Master of Science in the Health Sciences. I agree to abide by the requirements outlined in this document as well as the University requirements governing these degrees.

 Signature: \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

 Name (printed): \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

 Date: \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

I pledge to adhere to the University and program guidelines governing academic and professional standards as found in the following documents:

WVU Campus Student Code of Conduct

 <https://studentconduct.wvu.edu/campus-student-code>

Academic and Professional Integrity for the M.S. degree

 <http://catalog.wvu.edu/graduate/enrollmentandregistration/#academicintegritytext>

Section B.1 of this handbook and to maintain the highest standard of scientific integrity

 <http://oric.research.wvu.edu/>

 Signature: \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

 Name (printed): \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

 Date: \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_