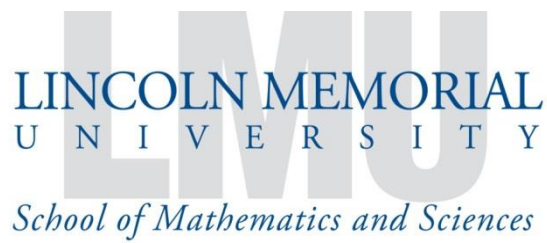


Master of Science
Biomedical Professions
Anatomical Sciences
Life Science Research

2013 – 2014 Catalog

6965 Cumberland Gap Parkway
Harrogate, Tennessee 37752
423.869.6330



Welcome to LMU!

Congratulations on your acceptance to Lincoln Memorial University's (LMU) Master of Science (MS) degree program! We are so excited that you have chosen to become a part of the LMU family.

The following important information has been compiled in hopes of making your time at LMU as successful as possible. As you will see we have included various items that will be beneficial to you. **It is important that you read these materials and thoroughly understand them.** In particular, please pay close attention to the Curriculum & Standards section. It is your responsibility as a student to make sure that you are familiar with the procedures and follow them accordingly.

You have an academically challenging year ahead of you. It is our hope that the MS program will serve you well and allow you to become prepared for the future you desire in medicine.

We look forward to welcoming you to campus!

Dr. Amiel Jarstfer

Master of Science, Administrative Dean
Dean, School of Mathematics and Sciences

Dr. Gerald Osborn

Master of Science Biomedical Professions Program Coordinator

Dr. Natalie Shirley

Master of Science Anatomical Sciences Program Coordinator

Holly Napier, MBA

Master of Science Recruitment & Student Services Coordinator

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UNIVERSITY'S MISSION AND PURPOSE

Lincoln Memorial University is a values-based learning community dedicated to providing educational experiences in the liberal arts and professional studies. The University strives to give students a foundation for a more productive life by upholding the principles of Abraham Lincoln's life: a dedication to individual liberty, responsibility, and improvement; a respect for citizenship; recognition of the intrinsic value of high moral and ethical standards; and a belief in a personal God.

The University is committed to teaching, research, and service. The University's curriculum and commitment to quality instruction at every level are based on the beliefs that graduates must be able to communicate clearly and effectively in an era of rapidly and continuously expanding communication technology, must have an appreciable depth of learning in a field of knowledge, must appreciate and understand the various ways by which we come to know ourselves and the world around us, and must be able to exercise informed judgments.

The University believes that one of the major cornerstones of meaningful existence is service to humanity. By making educational and research opportunities available to students, Lincoln Memorial University seeks to advance life throughout the Appalachian region and beyond through teaching, research and service mission.

Revised July, 2012; Approved by the Board of Trustees, November 13, 2012.

THE SCHOOL OF MATHEMATICS & SCIENCES

School Mission Statement

The mission of the School of Mathematics and Sciences is to provide quality academic programs, majors, minors, concentrations and pre-professional experiences taught by appropriately credentialed and competent faculty who foster a nurturing, scholarly and committed learning environment.

The School of Mathematics and Sciences also contributes to the general education component of the LMU experience emphasizing values-based learning, the principles of Abraham Lincoln's life, and knowledge in support of service to humanity while advancing life in the Appalachian region and beyond. The School of Mathematics and Sciences hosts not only baccalaureate major and minor programs, but includes specialized courses of study as pre-professional tracks that prepare students for entry into graduate and professional programs. These pre-professional programs include preparation for entry into medical, dental,

pharmacy, optometry, or veterinary schools. In collaboration with the Carter and Moyers School of Education, initial teacher licensure is supported in several content areas.

Department of Biology Mission Statement

The Department of Biology at Lincoln Memorial University strives to graduate students who demonstrate a notable command of content knowledge and practical skills in their program area of choice. Degree programs incorporate current methods of scientific inquiry, mastery of terminology, and proficient use of technology in the Life Sciences. Graduates of the Department of Biology are expected to utilize ethical standards in the practice of their profession, to demonstrate an ability to communicate clearly and effectively, and to recognize an appreciation for the value of life-long learning. Department graduates go forward to serve their communities, the region and humanity as informed voices for the advancement of understanding in the life sciences.

Master of Science Mission Statement

The Master of Science (MS) program at LMU is dedicated to providing advanced academic learning in the life sciences through graduate coursework, professional training, and research. Graduates from this degree program are able to independently explore an area of the primary literature of the life sciences, analyze and critique published research reports, and communicate about life sciences in formal oral and written modalities.

This academic program seeks to enhance the learning of three mission related post-baccalaureate populations of students:

- Those seeking doctoral-level education in the health-related professions.
- Those seeking in-depth and focused study of human anatomy.
- Those seeking to complete a thesis research project prior to a dissertation research project in the life sciences.

This LMU degree program is collaborative between the School of Mathematics and Sciences and the DeBusk College of Osteopathic Medicine (DCOM). Faculty from both areas work together to provide students with graduate courses and research opportunities.

DeBusk College of Osteopathic Medicine (DCOM) Mission Statement

To prepare outstanding osteopathic physicians who are committed to the premise that the cornerstone of meaningful existence is service to humanity. The mission of LMU-DCOM is achieved by:

- Graduating Doctors of Osteopathic Medicine;

- Providing a values-based learning community as the context for teaching, research and service;
- Serving the health and wellness needs of people within both the Appalachian region and beyond;
- Focusing on enhanced access to comprehensive health care for underserved communities;
- Investing in quality academic programs supported by superior faculty and technology;
- Embracing compassionate, patient-centered care that values diversity, public service and leadership as an enduring commitment to professionalism and the highest ethical standards.

MS PROGRAM OVERVIEW

The Master of Science (MS) program is a 30 graduate hour full-time program of study designed for college graduates who want to pursue further studies in the realm of life science. Three majors are offered in our MS program:

Biomedical Professions
Anatomical Sciences
Life Sciences Research

Each of these majors are individualized and tailored to help you as a student make the most of your graduate education. The programs have experienced oversight that is maintained by a direct program coordinator and an admissions committee consisting of faculty in the related field department. Courses for both semesters in the MS program are assigned by these committees on an individual student basis; the schedule of classes is based on which specific courses will be most beneficial to the student regarding their future academic/career goals.

Biomedical Professions

This program is designed to offer students a structured route to future entry into allopathic or osteopathic medical school.

Among the three MS majors, BP offers the most tailored route for students whose aspirations include medical school. Throughout the year of study, students will enroll in graduate courses along with medical school classes at the DeBusk College of Osteopathic Medicine

(DCOM). These medical school courses will be classes such as Medical Gross Anatomy and Histology taken alongside first-year DCOM students.

Other significant aspects of the program include the following:

- If a grade of “B” or above is earned in the DCOM courses, students who are accepted into DCOM will not have to repeat the classes during their first year of medical school. This means that for those students accepted into DCOM have the possibility of entering their first year of study with 7 – 12 hours of medical school courses already on their transcript, therefore significantly lessening the course load during the OMS-1 year.
- Students who maintain an overall 3.0 GPA or higher in the fall semester of the BP major and complete their AACOMAS application are guaranteed an interview at DCOM early in the spring semester. Before the actual interview, an interview workshop is conducted along with an individual mock interview with faculty/staff in MS program. For many of the students in the program, they will learn about their acceptance into DCOM by the middle of the spring semester in the BP program.

Anatomical Sciences

The Anatomical Sciences (AS) major is designed to assist students who foresee a future that involves working in the anatomy discipline. This can include working alongside an anatomist, teaching anatomy related courses at a community colleges, or even attendance of medical school. They also will be prepared to enter a Ph.D. program in several disciplines such as anatomy and biological anthropology.

LMU’s Hamilton Sciences Building houses the Neal Cross Memorial Anatomy Laboratory and model room. This is a state-of-the art human gross anatomy teaching suite. Donor programs allow MS students to have virtually unlimited access to study anatomy and take part in detailed dissections and plastinations. Additional research and teaching opportunities are also available to students in this major.

The AS major, like Biomedical Professions, will allow students to take DCOM courses alongside of first year medical school students. They too can earn between 7 and 12 hours that can be applied to their academic career at DCOM if grades are maintained in the program.

Life Science Research

The Life Sciences Research major is designed for students who wish to earn their Ph.D. or enter the workforce as researchers. Throughout the program students will work on a research project to complete their thesis. Core coursework includes Colloquial Principles of

Life Science, Research Design & Analysis and Scholarly Writing in the Life Sciences. Elective courses provide a selection of theory and techniques courses to support student thesis research. A limited number of assistantships are available to students who qualify.

MS ADMISSION REQUIREMENTS & PROCEDURES

Generally policies will follow existing LMU policies for master's degree programs with differences noted for this degree program. Any specific differences among the three degree tracks of this Master's degree are included in the curriculum and standards section of this catalog (p. 15).

Admission Requirements and Standards

- A. **Completed bachelor degree from an institution with regional accreditation or equivalent verification in the case of international degrees.** International degree must follow university policies in existence for certifying international degrees and/or credit.

Minimum undergraduate course work in the natural sciences and mathematics:

Mathematics	6 credit hours at the College Algebra level or higher
Biological Sciences	16 credit hours with labs
Chemistry	16 credit hours including 8 credits of Organic Chemistry and labs
Physics	8 credit hours of algebra- or calculus-based with labs

Recommended undergraduate course work:

Ethics
Probability & Statistics

- B. **Standard Test Scores and Grades**

Biomedical Professions majors:

MCAT score of minimum 22; cum GPA of 2.75 minimum; science GPA of 3.00

Anatomical Science and Life Science Research majors:

GRE combined minimum scaled score of 300 (verbal+quant.) and minimum 4.0 analytical writing

Cumulative and Science GPA of 3.00

C. Letters of Evaluation

Two letters of evaluation from the applicant's instructors or one committee letter from a health professions advisory committee. At least one letter must be from a natural science instructor.

Transfer credit – a maximum of relevant 6 graduate credits by approval only of the program-specific Master of Science Admissions Committee

Standing Oversight Committees

Admissions Committee – This committee consist of faculty and administration members from the collaborating programs.

For admission to the Biomedical Professions major, two faculty members from DCOM Basic Biomedical Sciences appointed by the DCOM Dean, the Program Director, and one faculty member from the Department of Biology.

For admission to the Anatomical Science major, two faculty members from DCOM Department of Anatomy appointed by the DCOM Dean and the Program Director.

For admission to the Life Science Research major, two research faculty from DCOM appointed by the DCOM Dean, the Program Director, and two research faculty members from the Department of Biology.

Thesis Supervisory Committees – These student focused committees function to provide course work and thesis project direction and approval for each individual graduate student in the Research major. Each committee conducts a comprehensive examination of the student after their first semester, reviews and approves of the thesis project proposal, reviews and approves of the completed thesis document, and conducts the final oral defense of the thesis project. The chair of this committee is typically the major professor who directly supervises the thesis research project. A second member is selected from the graduate faculty and should have reasonably-related knowledge for the research project topic. A third member is selected to complement the knowledge of the other two members and may be chosen from outside of the relevant departments. The appointment of this committee is made by the MS Administrative Dean upon recommendation of the Program Director.

Appeals Committee – This committee exist to resolve any academic matter that arises in the Master of Science program. Members of this committee will be nominated by the deans of the collaborating entities: Math and Science and DCOM. They will be confirmed by the VPAA and DCOM Dean to serve three years. One faculty member from each entity will serve with an alternate member appointed in cases of conflict of interests.

General Policies and Standards

Students must earn and maintain a cumulative grade point average (GPA) of 3.0 or more. Failing to reach this standard will result in academic probation. Successful completion of the degree program requires a 3.0 GPA. For students in the Life Science Research major, the supervisory committee will review the academic record on a semester-by-semester basis. The supervisory committee also will review thesis project progress each semester. The supervisory committee has the authority to recommend removal of the student from the program. The MS Administrative Dean will provide official notification in such cases.

The 3.0 GPA performance level includes graduate and undergraduate courses if the student is completing deficiency courses. Participation in elective courses is competitive and students will be selected based on professional and academic performance.

Appeals - Students and faculty members in the program or applying to the program may submit an appeal in writing directly to this committee. The committee is expected to collect information from all parties to the matter in question, hold a hearing in which parties to the appeal will be invited and notified with at least 48 hours advanced notice, and reach a decision on the matter within 24 hours of the hearing. In the eventuality that more investigation is needed after the hearing, all parties to the matter will be notified of the timeline for reaching a conclusion for the matter. A decision must be reached by no more than one week after the initial hearing. Decisions of this committee will be communicated to the party making the appeal as well as any individuals named in the appeal along with the relevant Deans and the Vice President of Academic Affairs. Final decisions will be communicated no more than 1 week after a hearing. A log of matters and copies of all communication related to an appeal will be maintained by the specific Program Director's office in which the appealing student is enrolled.

Medical Leave of Absence – A student may petition to their Program Director, for a medical leave of absence from a Master of Science major program of study in event of a medical condition which prevents normal participation in the required activities of the degree program for more than one week. For a student in the Life Science Research major, the petition should be supported by the supervisory committee affirming that the student is at a stage in their program where they may return and continue the approved thesis research or will be allowed to propose another research topic on return to active status in the program. If the supervisory committee is not supportive of continuation after the medical leave of absence, the student will need to request a different supervisory committee on return to active student status. If a supervisory committee cannot be assembled for the student, the student will be advised to complete a different major in the program or discontinue the Master of Science.

Program Acceptance

Admissions Committees are established for the three Master of Science majors. When reviewing application files the committee looks at numerous applicant criteria including standardized test score(s), undergraduate coursework, letters of recommendation, and any other pertinent materials that may be included with the file.

Upon acceptance into the Master of Science program, applicants will receive an official packet of materials including an acceptance letter, a program catalog, and any other items that may be deemed necessary. Deadlines regarding program deposits, residential life, immunization records, etc. will be included in the acceptance packet.

Acceptance Deposits

Upon your acceptance into MS it is of the utmost importance that you pay your deposit to LMU in a timely manner. This deposit secures your position in the upcoming limited capacity MS class. In order to make this deposit you have two options:

- If you choose to live in LMU housing you are required to submit a \$500 deposit along with your application for housing. This deposit is refundable at the end of residency providing that students meet certain criteria as discussed on the housing application. Mailing information regarding the deposit is on the upper left hand corner of the housing application. If you live on campus, this deposit is due by June 15th.
- Students who plan to live off campus must pay a \$500 deposit. These funds are allocated to your student account and will count toward expenses incurred (i.e. tuition, fees, etc.). If you plan to live off campus your \$500 deposit is due 5/31.

These deposits may be submitted by mail or by telephone. If paying by phone please contact the Cashier's Office at 423.869.6315. Students who are not living on campus and need to pay their deposit via mail may send a check or money order to the following address:

Lincoln Memorial University
Holly Napier – MANS 324
6965 Cumberland Gap Parkway
Harrogate, TN 37752

Tuition and Fees

Tuition for the Master of Science (MS) program in the 2013-2014 academic year is \$25,000. This tuition is split evenly between fall and spring semesters. The tuition includes a minimum of 12 academic credit hours during the fall 2013 semester and at least 12 academic credit hours during the spring 2014 semester. An additional Computer Fee of \$700 is added to the base tuition to cover the rental cost of the tablet computer hardware and software

provided by LMU for the support of the Medical Gross Anatomy course. You may use this tablet computer as your personal computer while in the program. The optional Kaplan MCAT preparatory course is an additional charge.

Information regarding the tuition for the MS 2014-2015 year will be posted when available.

Financial Aid

Financial Aid in the form of loans is available to MS students. The LMU Financial Aid website is www.lmunet.edu/admissions/finaid.shtml or they may be reached directly at 423.869.6336. The Financial Aid Office is located on the third floor of the Student Center. MS students who do not opt for federal loans often obtain the needed tuition funds through private loans, etc.

Orientations

As a MS student you will be required to attend two orientations. The MS Orientation will include program familiarization, establishing your fall schedule, finalizing your financial aid and completing the registration process. An orientation for library resources will occur in the first semester of the LSCI 603 course.

The second mandatory orientation is for DCOM students. You will be in this orientation alongside first year medical schools.

Change of Major Policy

At the end of the first semester after admission to the Master of Science degree program, a student may apply to change their major within the degree program. The student needs to recognize and understand that such a change may require additional course work and thus time to complete the degree. Changes at other points in the program must first be discussed with the Administrative Dean.

Process:

- Submit a Master of Science Change of Major form to the Recruitment and Student Services Coordinator.
- Review and action by the Master of Science Graduate Council.
- The Admissions Committee for the proposed major may review the academic record and stated reasoning of the student applying to change their major and make a decision.
- The Admissions Committee will notify the Recruitment and Student Services Coordinator, who will assist the student in any changes to their planned course of student and/or registration for the spring semester.

- If the change of major is not approved, the student will receive notification and explanation and should continue their course of study or seek other educational programs that will better meet their needs.
- Appeals of the decisions may be handled through the Master of Science Appeals Committee.

Graduation Requirements

A minimum of 30 credit hours graduate course work and satisfactory completion of all core courses is required for graduation with the Master of Science degree.

The Life Science Research major must be completed within 3 years full-time, or 5 years of part-time, after starting the program. Students in the Anatomical Science and Life Science Research majors must present their work at a regional professional meeting at a minimum. Publication or presentation in a national or international context is encouraged.

The student must maintain a cumulative G.P.A. of 3.00 or be placed on academic probation. Failure to meet or exceed this standard of academic progress in the subsequent semester will result in dismissal from the program.

Completion of all program and university assessments and surveys

MS STUDENT SERVICES & CAMPUS LIFE

Housing / Residential Life

Your application for campus housing is included with your acceptance packet materials. You will be given the option of living in an apartment style dorm on campus or in University Inn, which is approximately two miles from campus. Turner Bowling is the Director of Residence Life and may be reached at 423.869.6294 or via email at turner.bowling@lmunet.edu. More information is also available online at www.lmunet.edu/campuslife/residence. The Residential Life office is located on the first floor of Dishner Hall. **As mentioned previously, if you plan to utilize campus housing, your \$500 deposit is due by June 15th. MS move-in days will be announced at a close date.**

Dining Options

The campus cafeteria is located on the 1st floor of the Student Center. Meal plans are available for all students. Additional information regarding various meal plans and their costs can be found at www.lincolnmemorialuniversitydining.com/plans.html. Campus is also home to WOW (World of Wings) and Campus Grounds, which is a coffee bar. Both are located on the 2nd floor of the Student Center.

WebAdvisor

WebAdvisor is a web-based information management tool that allows candidates to access Lincoln Memorial University's administrative database. Information/functions available through WebAdvisor include Search for Classes, Student Profile, Class Schedule, Grades, Student Account, and Financial Aid. The candidate's account with the Finance Office must be paid in full and Perkins student loans must be in a current non-defaulted status in order for the candidate to access his/her academic grades on WebAdvisor. To access WebAdvisor on the Internet from LMU's web site, go to <https://webadvisor.lmunet.edu>. Each candidate is assigned a unique username and temporary password (which must be changed upon first log-in to WebAdvisor). **It is the responsibility of each candidate to ensure that his/her password remains confidential. Lincoln Memorial University does not accept responsibility for any password-related breach of security. The candidate has the option to decline the assignment of a username and password to access WebAdvisor.**

Library Services

Library services are provided for all graduate candidates through the campus library, through the library terminals located at all off-campus sites, and/or through Internet access to on campus databases. Candidates are given access codes and procedures by library personnel and instructors at the beginning of each semester.

Family Educational Rights and Privacy Act (FERPA)

The University complies with the provisions of the Family Educational Rights and Privacy Act, 1974, as amended. This law maintains that the institution will provide for the confidentiality of candidate's education records. No one outside the institution shall have access to nor will LMU disclose any information from candidates' educational records without the written consent of candidates except to personnel within the institution, to officials of other institutions in which candidates seek to enroll, to persons or organizations providing candidates financial aid, to accrediting agencies carrying out their accreditation function, to persons in compliance with a judicial order, and to persons in an emergency in order to protect the health or safety of candidates or other persons. All these exceptions are permitted under the Act. At its discretion, LMU may provide Directory Information in accordance with the provision of the Act to include: candidate name, address, telephone number, major field of study, dates of attendance, degrees and awards received, the most recent previous educational agency or institution attended by the candidate, participation in officially recognized activities and sports, and weight and height of members of athletic teams. Currently enrolled candidates may withhold disclosure in writing to the attention of the Registrar. Candidates may not inspect and review financial information submitted by their parents; confidential letters and recommendations associated with admissions, employment or job placement, or honors to which they have waived their rights of inspection and review; or educational records containing information about more than one candidate, in

which case LMU will permit access only to that part of the record which pertains to the inquiring candidate. Lincoln Memorial University maintains a list of all persons except other college officials who have received a copy of the candidate's educational record. A copy of the LMU institutional policy on the release of educational records is on file in the President's Office and the Registrar's Office.

ADA Statement

As a rule, all candidates must read and comply with standards of the LMU Student Handbook and LMU catalog. Any candidate seeking assistance in accordance with the Americans Disabilities Act (1990 as amended) should contact his/her instructor and the LMU ADA Compliance Officer, Jason Kishpaugh, with regard to required documentation and in order to make appropriate arrangements. Contact information: jason.kishpaugh@lmunet.edu and/or 423-869-6251 (800-325-0900, ext. 6251). The office is located on the third floor of the Student Center, room 319, on the main campus in Harrogate.

MS CURRICULUM & STANDARDS

The curriculum of the MS at LMU is designed to enhance a student's academic qualifications. All classes are preparatory coursework for medical school and other post-graduate goals. It is strongly recommended that students are not employed during the duration of the program. This ensures that they will be able to focus 100% upon their studies. **Please note that the following semesters and/or coursework are subject to change based upon individual student needs or as determined by the MS Admissions Committees and Program Directors.**

Fall Semester:

MS students will take Medical Gross Anatomy (MGA) along with first-year DCOM students. They will also be enrolled in additional credits, mostly science oriented, for a minimum 12 credit hours of study per semester. The course load, aside from MGA and any other assigned DCOM courses, may consist of graduate or undergraduate hours depending on each individual student's need. Students are recommended to carry a minimum course load of fifteen hours per semester.

Undergraduate/graduate coursework, which will be determined by the designated MS program Admissions Committee and/or Program Director can include the options listed below. The schedules are determined based upon evaluation of undergraduate transcripts by the MS Admissions Committee.

Biomedical Professions Major

Required Courses	
BCHM 503	Advanced Cellular Biochemistry (3)
LSCI 503	Adv. Molecular Genetics & Cell Biology (3)
LSCI 603	Colloquial Principles of Life Science x2 (2)
LSCI 604	Grad.Life Sci. Research Design & Analysis (3)
LSCI 606	Applied Ethics in Biomedical Sciences (3)
DO SYS 701	Medical Gross Anatomy (7)

Elective Courses	
LSCI 504	Adv. Techniques for Molecular Biology (2)
LSCI 506	Microscopic Imaging Theory & Tech. (2)
LSCI 507	Life Sciences Research Instrumentation (2)
LSCI 508	Techniques of Physiological Research (2)
LSCI 683	Life Science Grad. Research Project (3)
ANAT 699	Medical Gross Anatomy Dissection (3)
DO SYS 714	Medical Histology (5.5)
DO SYS 715	Neuroanatomy (3)

Anatomical Sciences Major

Required Courses	
ANAT 603	Methods of Curriculum Devel. & Teaching Human Gross Anatomy (3)
ANAT 604	Intro to Radiographic Anat. & Clinical Imaging (3)
ANAT 683	Graduate Anatomy Project (3)
ANAT 699	Medical Gross Anatomy Dissection (3)
LSCI 603	Colloquial Principles of Life Science x2 (2)
LSCI 604	Grad.Life Sci. Research Design & Analysis (3)
DO SYS 701	Medical Gross Anatomy (MGA) (7)

Electives Courses	
ANAT 653	Special Topics in Clinical Anatomy (1 - 3)
BCHM 503	Advanced Cellular Biochemistry (3) *
LSCI 503	Adv. Molecular Genetics & Cell Biol. (3) *
LSCI 504	Adv. Techniques for Molecular Biology (2)
LSCI 506	Microscopic Imaging Theory & Tech. (2)
LSCI 507	Life Sciences Research Instrumentation (2)
LSCI 508	Techniques of Physiological Research (2)
LSCI 606	Applied Ethics in Biomedical Sciences (3)
LSCI 693	Life Science Thesis Research (1 - 9)†
DO SYS 714	Medical Histology (5.5)
DO SYS 715	Neuroanatomy (3)

Supervisory committee will determine exact courses for each student.

* Students planning to attend medical school after earning their MS are required to take these courses.
 †Thesis research will be overseen by supervisory committee.

Life Science Research Major

Required Courses		Elective Courses	
LSCI 603	Colloquial Principles of Life Science x2 (2)	BCHM 503	Advanced Cellular Biochemistry (3)
LSCI 604	Grad.Life Sci. Research Design & Analysis (3)	LSCI 503	Adv. Molecular Genetics & Cell Biol. (3)
LSCI 605	Scholarly Writing in Life Science (2)	LSCI 504	Adv. Techniques for Molecular Biology (2)
		LSCI 505	Advance Ecology & Field Biology (3)
LSCI 693	Life Science Thesis Research (1 - 9)	LSCI 506	Microscopic Imaging Theory & Tech. (2)
		LSCI 507	Life Sciences Research Instrumentation (3)
		LSCI 508	Techniques of Physiological Research (2)
		LSCI 606	Applied Ethics in Biomedical Sciences (3)
		LSCI 653	Life Science Grad. Special Topics (1 - 3)
		LSCI 683	Life Science Grad. Research Project (1 - 3)

Supervisory committee will determine exact courses for each student.

The academic standards of MS are clearly defined and bulleted below. These standards are designed to ensure that students are successful in their studies, both in MS and in their future medical school careers. **They are strictly enforced and will not be compromised.**

- No students will be able to enroll in any Masters of Business Administration courses while taking MS courses. Students in the DO-MBA program must take the MBA courses in the summer following their first two MS semesters.
- MS course plans are developed by the major-related Admissions Committee upon a student's acceptance to the program. This curriculum will consist of any deficiency courses† s deemed as necessary by the committee. You may be advised to retake courses that you previously completed in your undergraduate studies. In this instance the committee feels that your application package for medical school will be stronger with the repeated course(s). You must to take the classes assigned to you by the Admissions Committee and Program Director.
- The Admissions Committee for the major and the Program Director will determine the courses for each Biomedical Professions and Anatomical Sciences student. The Supervisory committee will determine these for the Life Science Research students.

- In order to enroll in DCOM classes in the spring semester students must meet academic performance requirements. **If a student earns a grade lower than 80% and/or a letter grade less than a “B” in either their undergraduate or DCOM classes they will not be permitted to take DCOM classes in the spring semester.**
- Failure to maintain a composite 3.0GPA in the fall semester will result in the loss of your DCOM interview.
- Students who do not maintain a 3.0 GPA in the fall semester will be placed on Academic Probation. **Failure to maintain a 3.0 GPA by the end of the second semester, or receiving a grade lower than C in either semester, will result in dismissal from the MS.**

‡ **Potential Undergraduate Coursework**

BIOL 315 Molecular Genetics	3 hours
BIOL 360 Immunology	3 hours
BIOL 441 Biochemistry	4 hours
MATH 270 Probability & Statistics	3 hours
PHIL 420 Ethics	3 hours
PHIL 430 Medical Ethics	3 hours

MS COURSE DESCRIPTIONS

The following courses may be offered in the MS program. This is not an exhaustive list. **Classes may be modified at the discretion of the program coordinators and/or school dean.**

Graduate Course Descriptions

ANAT 603 Methods of Curriculum Development and Teaching Human Gross Anatomy (3 credit hours) This course provides an analysis of curriculum development and methods for aligning course content to goals and evaluation procedures. The philosophical, historical, and psychological foundations of curriculum will be explored to help students better understand how curriculum models might be utilized in an ever changing and emerging educational environment. Topics will include Gross/Developmental, microscopic and neuroanatomy. Pre-requisites: DO SYS 701, 714, 715.

ANAT 604 Introduction to Radiographic Anatomy and Clinical Imaging (3 credit hours)

This unit provides an understanding of the basic anatomy of the head and neck, thorax, abdomen and pelvis, as well as the limbs. Radiographic images, cross-sectional imaging software, and diagrams are used to support the learning process. Pre-Requisites: DO SYS 701 and 714.

ANAT 653 Special Topics in Clinical Anatomy (1-3 credit hours)

This course is an independent study in which the student will conduct readings and engage in weekly conferences with a specified faculty member. Depending on the topic, students may complete a course project. This course may be repeated with a different topic. Faculty permission required. Prerequisite: admission to the Master of Science program and any additional specific requirements for the topic.

ANAT 683 Graduate Anatomy Project (3 credit hours)

The graduate student conducts anatomical research under the supervision of a graduate research mentor. A written research report is required to complete the course. May be repeated for credit. Pre-Requisites: Admission to the Master of Science program and permission of instructor.

ANAT 699 Medical Gross Anatomy Dissection (3 credit hours)

A graduate level course designed for the continued study of medical gross anatomy by method of full human dissection. Students will begin with basic dissection techniques and advance to more detailed methods. All sections of human anatomy will be covered i.e. musculoskeletal, thorax, abdomen, pelvis, neck and head. Evaluation will be based on a performance grading rubric. Pre-Requisite: Completion of DOSYS 701 with a final grade of "B" or higher.

BCHM 503 Advanced Cellular Biochemistry (3 credit hours)

This course will provide an advanced focus on 1) biomolecules (amino acids, protein structure and folding, protein function with emphasis on hemoglobin and myoglobin, carbohydrate, lipid and membrane structure and function); 2) enzyme kinetics and regulation of enzyme activity; and 3) metabolism of carbohydrates, lipids, amino acids and nucleotides. Each will be related to theme of regulation and integration of these metabolic pathways and how they differ in the muscle and the liver. Students are expected to present and discuss at least one recent paper from the primary literature relevant to the course topics. Pre-Requisites: Admission to the Master of Science program and satisfactory completion of an upper-level undergraduate biochemistry course.

LSCI 503 Advanced Molecular Genetics and Cell Biology (3 credit hours)

This course is an in-depth coverage of Eukaryotic and Prokaryotic molecular cell biology. Topics include structure and utilization of the organismal genome; nuclear and cytoplasmic division; membrane structure, transport, and compartment dynamics; cell communication;

cell-cycle regulation; cytoskeletal structure and dynamics; cellular aspects of multicellular development and apoptosis. Assigned readings in current primary literature will be used to extend learning of topics in this course. This course has a required critical analysis paper. Pre-Requisites: Admission to the Master of Science program and satisfactory completion of an undergraduate genetics course.

LSCI 504 Advanced Techniques for Molecular Biology (2 credit hours)

This course integrates theoretical underpinnings of contemporary molecular techniques with applied skills using those techniques. Each student is expected to successfully perform each technique and create a written report the results using publication standards of a current refereed journal. The actual menu of techniques may vary depending on the students' areas of interest. Typically techniques will include PCR, bacterial transformation, advanced agarose and polyacrylamide electrophoresis, Western, Southern, and/or Northern blotting, ELISA, or animal tissue culture. Pre-Requisites: Admission to the Master of Science program and satisfactory completion of an undergraduate genetics course.

LSCI 505 Advanced Ecology and Field Biology (3 credit hours)

This course entails an in-depth examination of current ecological concepts and methods via a review of both classical and contemporary landmark peer-reviewed literature. Major ecological principles and their applicability across various ecological systems and biological hierarchical scales will be critically discussed. The course will also address experimental design and implementation as well as data analyses and interpretation for field experimentation. The student will conduct a primary literature review, write a paper, and give an oral presentation on an ecological topic upon approval by the instructor. Pre-Requisites: Admission to the Master of Science program and satisfactory completion of an undergraduate ecology and statistics course.

LSCI 506 Microscopic Imaging Theory and Techniques (2 credit hours)

This course will address light, electron, atomic force, and confocal microscopy as complimentary study methods. The history of microscopy will allow comparison and contrasts of light and electron optics. The focus of the course will be on advanced imaging techniques, especially electron microscopy. Electron paths will be followed from filament generation of primary electrons, focusing electrons through the column, to specimen interactions generating secondary and backscattered electrons, and X-rays. Techniques will include sample fixation, dehydration, mounting, coating and storage for high and low vacuum systems. A discussion of X-ray microanalysis will show the quantitative side of advanced imaging. Students will gain hands-on experience with scanning electron microscopy. This course has complimentary lecture and lab assignments. Pre-Requisites: Admission to the Master of Science program.

LSCI 507 Life Sciences Research Instrumentation (2 credit hours)

This course introduces students to analytical technology platforms used in life sciences molecular research. The course will review specific technologies, online databases, online calculators, and primary literature review strategies. The course will include significant laboratory instruction each week with advanced orientation to technologies including mass spectrometry, NMR, PCR, and cell fractionation. Students will be introduced to protocols for obtaining and preparing biological materials for analysis as well as relating molecular characterizations to the genome and metabolism. Critical review of the literature, including assigned readings, will be a key element to all aspects of the course. Two papers are required: a research methodology review and a grant proposal. Pre-Requisites: Admission to the Master of Science program.

LSCI 508 Techniques in Physiological Research (2 credit hours)

This course will introduce well-accepted methods, rationale and limitations for evaluating and array of functions in humans and animals. This course will provide students with the skills necessary to construct solid research designs for research applications, and the foundation required to critically review studies in the field of physiology. Pre-Requisites: Admission to the Master of Science program and satisfactory completion of an upper-level biochemistry course.

LSCI 603 Colloquial Principles of Life Science (1 credit hour)

Selected diverse articles from the primary literature of the life sciences are critically presented and discussed. Attendance required. Course may be repeated for credit. . Pre-Requisites: Admission to the Master of Science program.

LSCI 604 Graduate Life Science Research Design and Analysis (3 credit hours)

This course covers the principles and applications of research design in the life sciences. This includes framing and articulating a research question, creating testable hypotheses, collecting valid data, approaches to data analyses, and presentation of results. Examples from the primary literature will be discussed and evaluated. Pre-Requisites: Admission to the Master of Science program and satisfactory completion of an undergraduate statistics course.

LSCI 605 Scholarly Writing in Life Science (2 credit hours)

This course focuses on formal scientific writing. It emphasizes concise communication of the research process. It includes both written and oral presentations of previous relevant background studies, statement of the research question, detailing of materials and methods, linkage of claims, warrants, and evidence, and concluding discussions. A written research proposal draft is required for completion of this course. Pre-Requisites: LSCI 604 and recommendation of supervisory committee.

LSCI 606 Applied Ethics in the Biomedical Sciences (3 credit hours)

Applied Ethics is the inquiry from the standpoint of moral philosophy into practical decision making. The focus of the course will concern ethical issues in relation to research and practice in the biomedical sciences. The course's instructional format will include a combination of lecture, video, small group discussion, and seminar. It will also include independent study of a focused topic selected by the student in consultation with their supervisor. The course will be primarily "Case-Based" covering a range of topics with the emphasis on ethical decision-making. Ethical theory will be discussed in relation to making the most reasoned and informed argument for practical courses of action. Special attention will be given to the ethical dimensions of research involving human and non-human subjects.

Pre-Requisites: Admission into the Master of Science Program and at least one prior undergraduate course in ethics.

LSCI 653 Life Science Graduate Special Topics (1-3 credit hours)

Various specific life sciences topics are covered which include in-depth presentation, analysis and discussion of the related primary literature. May be repeated with a different topic. Pre-Requisites: Admission to the Master of Science program and permission of instructor.

LSCI 683 Life Science Graduate Research Project (1-3 credit hours)

The graduate student conducts life science research under the supervision of a graduate research mentor. A written research report is required to complete the course. May be repeated for credit. Pre-Requisites: Admission to the Master of Science program and permission of instructor.

LSCI 693 Life Science Thesis Research (1-9 credit hours)

The graduate student conducts life science research under the supervision of a graduate research mentor for completion of the approved Master of Science thesis proposal. May be repeated for credit at the discretion of the supervising committee. By permission of supervising committee only. Pass/Fail.

DeBusk College of Osteopathic Medicine (DCOM) Courses

DO SYS 701 Medical Gross Anatomy (7 credit hours)

Medical Gross Anatomy is the study of the body's structure. The course is organized by the four major body regions: upper limb; back and lower limb; thorax, abdomen and pelvis; and head and neck. Laboratory prosections and dissections will be utilized throughout the entire course. Supplemental lectures and tutorials will also be given. Computer-aided instruction will be used to help students learning anatomy. The student is expected to learn anatomical terminology, three-dimensional, radiological and live (palpatory) anatomy. Throughout the course students will be challenged to relate the anatomy to solving clinical problems. The

latter is an integral part of the anatomy curriculum. Students will be evaluated by a series of five written examinations and five laboratory practical exams. **(19 weeks)**

DO SYS 714 Medical Histology (5.5 credit hours)

Medical Histology I is designed to give students a foundation of the basic structural and functional organization of cells and tissues in the human body. Histology I focuses on the histologic study and microscopic anatomy of basic tissue types. This course is taken during the first semester of the first year of medical school. The understanding of the normal histology presented in this course is critical for the student's ability to: (1) envision the cellular/tissue structures associated with the biochemical and physiological processes explained in other courses, and (2) identify and comprehend the abnormal histology presented in Pathology. **(16 weeks)**

DO SYS 715 Neuroanatomy (3 credit hours)

This course provides a survey of the neuroanatomy and systems physiology of the central, peripheral and autonomic nervous systems. There are two major goals for this course. By the end of the course, using knowledge of neuroanatomy and neurophysiology, the student will be able to: 1) explain the reasoning for each step of the neurological exam, and 2) explain the mechanisms underlying a neurological patient's signs and symptoms. **(8 weeks)**

FACULTY/STAFF CONTACT INFORMATION

A directory of all LMU employees is present on our website, www.lmunet.edu. For your convenience the most frequently needed contacts for MS students are listed below.

Faculty

While many part-time and adjunct faculty make valuable contributions to the teaching and learning at Lincoln Memorial University, only full-time employees holding faculty rank in academic schools offering undergraduate degrees are included in this catalog. Professional school faculty are included in the applicable school graduate catalog. The date following each name indicates year of initial LMU faculty appointment.

Bassett, Casey

Associate Professor, Anatomy/Histology

PhD Cellular & Molecular Pathology, Vanderbilt University

BS Biochemistry, Tennessee Technological University

Colle, Clarence “Chip”

Professor, Microbiology

Assistant Dean, Academic Affairs/Basic Medical Sciences

PhD Microbiology, Immunology and Parasitology, Louisiana State University

BS Geology, Mt. Union College

Fowler, Jason

Assistant Professor, Biochemistry

PhD Ohio State University

Gassler, John

Assistant Professor of Anatomy

DPT, Hardin-Simmons University

MS Anatomy, Hardin-Simmons University

Gromley, Adam

Assistant Professor of Molecular/Cellular Biology

PhD Biomedical Sciences, University of Massachusetts Medical School

BA Microbiology & Molecular Cell Science, University of Memphis

Gromley, Zeynep

Assistant Professor of Biochemistry

PhD Biochemistry, Medical College of Wisconsin

MS Biochemistry, University of Dokuz Eylul, Izmir Turkey

BS Biological Sciences, University of Dokuz Eylul, Izmir Turkey

Henderson, Melissa

Assistant Professor, Biochemistry and Molecular Biology

PhD Biochemistry and Molecular Biology, Eastern Carolina University

BS Biology, Northern Arizona University

Hermey, Donna

Professor of Anatomy, DeBusk College of Osteopathic Medicine

PhD Anatomy & Cell Biology, Temple University

BS Biology, Muhlenberg College

Jarstfer, Amiel

Professor of Biology

Dean, School of Mathematics and Sciences
Chair, Department of Biology
Administrative Dean, Master of Science Degree Program
PhD Plant Pathology, University of Florida
BS Biology, Friends University

Johnson, Robert

Chair, Physiology and Pharmacology/Associate Professor, Physiology
Ph.D. in Physiology, University of Missouri-Columbia
M.S. in Pharmacology, University of Missouri-Columbia
B.S. in Psychology, Southwest Missouri State University

Leo, Jonathan

Assistant Vice President Admissions & Students, Health Sciences/Associate Dean of Students/
Professor of Neuroanatomy, DeBusk College of Osteopathic Medicine
PhD Anatomy, University of Iowa
BA MacAlester College

Osborn, Gerald

Program Director, Master of Science, Biomedical Professions
DO, A.T. Still University
MP Medical History, Cambridge University (Master of Philosophy
Shiller College
Wilmington College

Palazollo, Dominic

Professor, Physiology
PhD Physiology, Kansas State University
MS Anatomy & Physiology, Kansas State University
BS Biology, Providence College

Ryder, Cynthia

Assistant Professor of Biology
PhD Microbiology and Immunology, Wake Forest University
BS Biology, Furman University

Shirley, Natalie

Assistant Professor of Anatomy
PhD Biological Anthropology, University of Tennessee
MA Anthropology, Louisiana State University
BA Anthropology & German, Louisiana State University

Throckmorton, Zach

Assistant Professor of Anatomy

PhD Anthropology, University of Wisconsin-Madison

MS Anthropology, University of Wisconsin-Madison

MS Human Biology, University of Indianapolis

BS Anthropology-Zoology, University of Michigan

Staff

Name	Title	Tel. Ext.	Email	Office Location
Adam Brambley	Computer Support Technician	7116	adam.brambley@LMU.net.edu	MAS
Turner Bowling	Director of Residential Life	6294	turner.bowling@LMU.net.edu	Dishner Hall
Bryan Erslan	Executive Director of Financial Aid	6465	bryan.erslan@LMU.net.edu	SC, 3rd Floor
Janette Martin	Director of Admissions, DCOM	7102	janette.martin@LMU.net.edu	DCOM 316
Holly Napier	Master of Science Recruitment & Student Services Coordinator	6027	holly.napier@LMU.net.edu	MAS 324
Jill Neely	Director of Student Accounts	6282	jill.neely@LMU.net.edu	SC, 3rd Floor
Jennifer Wampner	Administrative Assistant, Math & Sciences Department	7071	jennifer.wampner@LMU.net.edu	MAS 327E

Contact Information by Department

Department	Telephone	Campus Location
LMU Bookstore	423.869.6306	2nd Floor, Student Center
Financial Aid	423.869.6336	3rd Floor, Student Center
LMU Post Office	423.869.6301	Lower Level, Tex Turner Arena
Registrar	423.869.6313	3rd Floor, Student Center
LMU Security	423.869.6338	Upper Level, Tex Turner Arena
Residential Life	423.869.6212	Dishner Hall

Cashier's Office	423.869.6315	3rd Floor, Student Center
Student Services	423.869.6201	3rd Floor, Student Center

Contact Information Key:

SC = Student Center

DCOM = DeBusk College of Osteopathic Medicine

MAS = Math & Science Building

MS/DCOM 2013 – 2014 ACADEMIC CALENDAR






Fall 2013

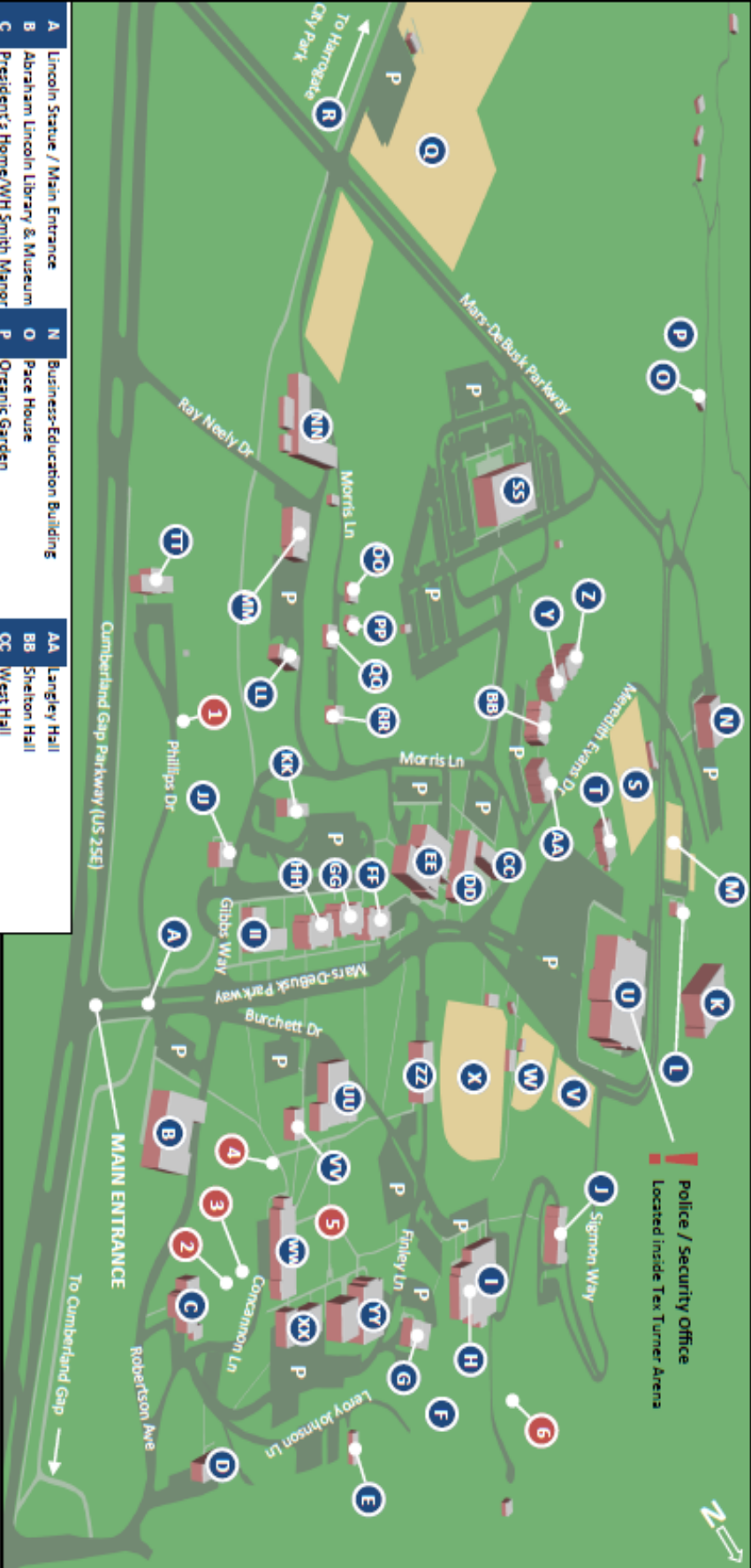
Orientation	July 30 – August 1, 2013
OMS I Classes Begin	August 2
OMS II Classes Begin	August 5
Undergraduate Classes Begin	August 19
Last Day to Complete Registration	August 28
Labor Day Break	September 2
White Coat Ceremony	September 28
Fall Break (AOA Convention)	September 30 – October 1
Undergraduate Mid-Terms	October 14 - 18
Thanksgiving Break	November 26 – 29
Undergraduate Final Exams	December 9 - 13
Christmas Break	December 20, 2013 – January 3, 2014

Spring 2014

Residence Halls Open	January 5, 2014
Classes Begin	January 6
Last Day to Complete Registration	January 15
Martin Luther King Jr. Day Break	January 20
Undergraduate Mid-Terms	February 24 - 28
Undergraduate Spring Break	March 24 - 28
TOMA Convention	TBD
Undergraduate Final Exams	April 28 – May 2
Class of 2014 Graduation	May 10
End of Semester OMS-1	May 30
End of Semester OMS-2	May 23
Last Day to Take COMLEX I Exam	June 16
OMS-II Remediation Exams	May 29 - 30

Main Campus Map
Harrogate, Tennessee

-  Campus Buildings
-  Athletic Fields/Complexes
-  Parking
-  Sidewalks
-  Roads



A	Lincoln Statue / Main Entrance	N	Business-Education Building	AA	Langley Hall	NN	Phillips Vet Tech Center	XX	Farr-Chincock Hall
B	Abraham Lincoln Library & Museum	O	Pace House	BB	Shelton Hall	OO	Robertson House	YY	Harold M. Finley Learning Resources Center (Library)
C	President's Home/W.H. Smith Manor	P	Organic Garden	CC	West Hall	PP	Alumni House / Sigmom House	ZZ	J. Frank White Academy
D	Kreage Hall	Q	Golf Complex	DD	Lies Hall	QQ	Cumberland Mintn Research Center	1	Huff Tower
E	Water Filtration Plant	R	Harrogate City Park	EE	Student Center	RR	Bailey House	2	Spring House
F	Water Storage	S	Soccer Field	FF	Dishner Hall	SS	DeBuck College of Osteopathic Med	3	Amphitheatre
G	Sigmom Communications Center	T	Schenck Center	GG	Mitchell Hall	QQ	Cumberland Mintn Research Center	4	Alpha Alumni Park
H	Mary S. Annan Natatorium	U	Tex Turner Arena	HH	Pope Hall	RR	Bailey House	5	Campus Quard
I	Mary Marz Gymnasium	V	Annan Tennis Courts	II	LaFrentz-Poole Hall	SS	DeBuck College of Osteopathic Med	6	Democrat Hollow / Ropes Course
J	Grant-Lee Hall	W	Dorothy Neely Field (Softball)	JJ	Munson House	TT	Byram Hall		
K	Math and Science Center	X	Lamar Hemmon Field (Baseball)	KK	Bluebird Hall	UU	Duke Hall		
L	Postat Tennis Complex	Y	Building 3	LL	Poetry Shop	VV	Elizabeth D. Chincock Chapel		
M	Tennis Courts	Z	Building 4	MM	Maintenance Building	WW	Avery Hall		

