MOLECULAR CELL BIOLOGY & GENETICS – 2025
Course Description

CONTENTS

I. MOLECULAR CELL BIOLOGY AND GENETICS (MCBG): COURSE GOALS AND OBJECTIVES

Course Goals:
The central goals of the Molecular Cell Biology and Genetics course are:

1. To provide students with a strong foundation in the principles of molecular and cellular biology, biochemistry, and genetics along with their connections to medicine

2. To develop team-based problem solving and analytical skills that are applicable to the biomedical sciences.

3. To provide students with solid grounding in the basic concepts of appraising medical literature and electronic resources for validity, applicability, and limitations.

Specific key concepts and learning objectives will be provided for each lecture. General course learning objectives are as follows.

Course Learning Objectives:
At the end of the course students will be able to:

MEDICAL KNOWLEDGE

1. Describe the steps of the scientific method and explain its relationship to a differential diagnosis and the principles of evidence-based medicine.

2. Utilize the principles of evidence-based medicine to search electronic resources, identify, and appraise medical literature relevant to the pathogenesis or treatment of a disease of your choosing, and provide a written report of your findings to MCBG faculty members for feedback.

3. Discuss the structure and function of proteins including the roles of individual amino acids in protein folding, charge, acid/base properties, and protein-protein interactions, using hemoglobin as one example.

4. Explain the principles of enzyme kinetics and how enzyme activity can be altered by drugs that act as competitive, non-competitive or irreversible inhibitors.

5. Analyze and interpret data and graphs related to protein expression and function, enzyme kinetics, and malfunctions of these processes in disease

6. Discuss chromatin structure and how it can be modified to affect gene expression.

7. Explain the mechanisms of DNA replication and repair, RNA synthesis and processing and protein synthesis in eukaryotic cells.

8. Describe how gene expression is regulated at the transcriptional and post-transcriptional level.

9. Analyze and interpret data and graphs generated from common laboratory techniques used to manipulate and amplify DNA, measure RNA expression, detect alterations and mutations in DNA including their role in the diagnosis of disease.

10. Apply the principles of genetics to produce a family pedigree from a family history and distinguish different patterns of inheritance for single gene disorders linked to autosomes, sex chromosomes and mitochondrial genes.

11. Describe methods used to determine the relative contribution of genes and environment to common disorders with complex inheritance, and to provide genetic counseling based on empirically derived risk tables.

12. Demonstrate an understanding of population genetics including allelic frequency, genotypic frequency, and the Hardy-Weinberg equation.

13. Perform a literature search on a specific genetic disease and inform other students of the findings in a written abstract and an oral presentation.

14. Demonstrate an understanding of cell structure and the functions of organelles.

15. Describe the mechanisms of vesicular and protein transport to various subcellular sites.

16. Discuss the mechanisms of cell to cell signaling, including intracellular second messenger pathways.

17. Analyze and interpret data and graphs related to cell biology and its malfunction in disease.

18. Explain the cell cycle and its regulation, including the mechanism of mitosis.

19. Demonstrate an understanding of molecular pathways that are altered in cancers including oncogenes, tumor suppressors, apoptosis, angiogenesis, and DNA repair.

20. Analyze and interpret data and graphs related to targeted cancer drug therapy involving cultured cells, animal models, and human clinical trials.

INTERPERSONAL AND COMMUNICATION SKILLS

1. Demonstrate the ability to effectively communicate and work collaboratively with peers in the small group setting to successfully address problem sets in molecular cell biology and genetics.

2. Contribute to the education of peers by actively engaging in small group sessions and by clearly communicating information in an oral presentation based on a personal literature search on a specific genetic disease.

PRACTICE-BASED LEARNING AND IMPROVEMENT

1. Critically evaluate one's performance in the course to identify strengths and personal limitations in either knowledge or study methods; develop learning goals to address any deficiencies and actively seek out assistance from appropriate sources to successfully remediate those deficiencies.

2. Demonstrate an ability to use online resources to objectively identify and evaluate the primary basic scientific and clinical literature relevant to the molecular basis and treatment of disease.

PROFESSIONALISM

1. Demonstrate professional behavior by completing all course requirements, including course evaluations, in a timely manner

2. Demonstrate professionalism by behaving in a professional, courteous, and respectful manner when engaged in course activities or interacting with course faculty and staff.

3. Demonstrate responsibility and accountability by attending and being punctual at all required course activities such as small groups, team-based learning exercises, and exams.

4. Demonstrate professional behavior by requesting any excused absence from required course activities well ahead of the scheduled date.

5. Demonstrate professional behavior by responding to direct communication from the Course Director in a timely fashion, particularly in circumstances when a face-to face meeting is requested to discuss issues related to academic performance

6. Demonstrate professional and ethical behavior by honestly completing course examinations without attempting to seek an advantage by unfair means; and by reporting any unethical behavior of peers to the course administration.

II. ORGANIZATION OF THE COURSE.

A. Overview

The emphasis of the course will be on student-centered learning. The class will meet in-person for approximately 3 hours daily, five days a week.

B. Lectures

All lectures will be pre-recorded using the Panopto software platform and delivered asynchronously to view at your convenience. Lecture links are posted on the MCBG Sakai site and found under Session Materials. The entries in Session Materials are

organized by lecture and date. In addition to the video link, students will find the following supplemental materials posted for most lectures:

1) A PowerPoint file containing copies of slides from the lecture presentation
2) A list of lecture specific key concepts / learning objectives
3) A reading assignment from one of the course textbooks.
4) A handout containing figures and explanations from the lecture.
Lecturers are given the professional freedom to prepare their handouts based on how they feel the material can best be conveyed. Some professors have not provided a separate handout. They have elected to either utilize the notes section on the PowerPoint file to provide text that would have been on a handout or to add explanations directly to their slides.

Each day, a lecture will be assigned for viewing. Because the lectures are asynchronous, the time listed on the LUMEN calendar is a place holder for administrative purposes but does not reflect when lectures are available for viewing. The Course Director has requested faculty provide all course materials one week in advance of the assignment date to provide our students with the maximum flexibility for viewing. In some cases, materials may be posted earlier or posted closer to the assigned date, based on the lecturer's schedule. The materials will always be available on the assigned date.

You will also be responsible for **two additional recorded lectures**. The **Library Lecture** will introduce you to online resources that will help you with your two research projects (details are below). This lecture can be viewed at your convenience, but it is meant to guide you through your preliminary search related to your topic for the MCBG Independent Research Project and the Genetics Project. The library staff is available to provide one-on-one help for any student who desires more information. Contact information will be provided in the lecture or visit their website (http://library.luhs.org/hslibrary/index.htm). The **Scientific Method lecture** is a short lecture covering the scientific method and how it underlies clinical decision making and evidence-based medicine. The lecture can be viewed at your convenience but should be **reviewed prior to the Exam 1 as questions will be on this exam for the lecture**.

We recommend that you review the lecture handout prior to viewing the lecture recording. This will allow you to anticipate topics to be covered in the lecture video. You can pay particular attention to difficult concepts and write down any questions.

C. Small Group Problem Solving Sessions

Small group problem solving sessions (SGPSS) give you the opportunity to integrate information and to apply knowledge to analyzing and solving problems. The problem sets don't focus on recall of lecture information, but instead the problems require you to apply the information to clinical and experimental scenarios that can challenge you to go beyond the boundaries of the lecture material.

The day following the lecture assignment, there will be a **1-hour 45-minute SGPSS beginning at 9:00 a.m**. In line with current school policy, **attendance at Small Groups is mandatory**. Failure to attend and participate in small groups will result in

an evaluation of DOES NOT MEET EXPECTATIONS in your Professionalism and Practice-Based Learning and Improvement competencies component of the course. If, for whatever reason, you find that you have a legitimate reason for being unable to attend a particular small group session, you need to seek advance permission from the Office of Student Affairs. Small group sessions are not recorded.

A problem set related to the previous day's lecture will be provided in Sakai for you to download to your tablet or personal computer approximately 15 minutes prior to the start of small group. The problem set can be found in MCBG Sakai under Resources in a folder with the name of the corresponding lecture. Each group will have a white board and markers to review concepts, summarize problem-set data, brainstorm, etc. Using the white board as a visual aid can greatly enhance learning in the small group sessions. It helps the group to focus on a common concept or an idea posited by a group member.

Lecture material should be reviewed prior to the SGPSS. It is your professional obligation to come to each small group session on time and prepared to contribute intellectually to the conversation and problem-solving process. Preparation will be considered when evaluating your competency in professionalism.

At least one faculty facilitator will be available in each room during every small group session. Consistent with the student-centered philosophy of this course, **the faculty facilitators will monitor the groups and assist them in the discussion process but will not function as content experts**. Facilitators will not lecture. They may answer questions at their discretion but are instructed to respond to a question with another question to guide students in the right direction or to direct students to raise the issue during the "recap session". If the group has a question that can't be answered by its members, the question can be written down on a note card that is provided daily. Students can hand the notecard to the lecturer (or place it on the podium) prior to the beginning of the recap session.

Halfway through the course, students will have a one-on-one meeting with one or more of their facilitation team. The goal of the meetings is to:

1. Allow the student to talk to the facilitator in a private setting where any concerns regarding their group dynamics or performance can be raised.
2. Allow the faculty member to provide feedback on the student's performance in small group in the areas of communication, professionalism, and their approach to problem solving.

A combination of good communication and problem-solving skills, a lively curiosity, and preparation (by reading through the handouts and related textbook material and actively listening to lectures) will assure that one of the goals of small group sessions is met, namely that you achieve a deeper understanding of concepts by applying your knowledge in novel contexts. A successful small group has members who have a combination of interpersonal skills including the ability to listen, to pose questions, and to communicate ideas effectively both orally and in writing. Importantly, they have respect for one another and the desire to include everyone in the discussion. At the end of the course, the **faculty facilitators will provide a summative evaluation of**

your competency in Interpersonal and Communication Skills, Practice-Based Learning and Improvement, and Professionalism based on your performance in small group.

D. Recap and Q & A Sessions

The SGPSS is followed by a 15-minute break and at **11:00 a.m. the Recap and Q & A Session begins. Recap is a 1-hour session** where the faculty member explains the answers to the problem set and answers student questions about the problem set or lecture material. These sessions are recorded using the lecture hall recording system and are available only through the LUMEN calendar.

In addition to this live session, answer keys (called facilitator guides) and Recap PowerPoint slide sets will be released to students later on the same day. This provides students with access to correct answers if new questions arise as they are preparing for an exam. The answer key and slide set can be found in Sakai under Resources in the folder corresponding to the associated lecture.

E. Review Sessions

Faculty who lectured Monday – Thursday (and the previous Friday) will usually hold **review sessions on Friday afternoons**, although dates and times will vary as the course moves forward. The dates, times, and locations of review sessions are listed on the LUMEN calendar and will be announced through Sakai Announcements as a reminder.

Each lecture is given 30 minutes for review. Interested students should come prepared with questions as there is a limited time allotted for each lecture. Faculty are requested to quickly go through the lecture slides highlighting high yield material. Students should be prepared to ask questions about specific material when relevant slides are available to aid in explanations. We will adhere strictly to the 30-minute time limit to be respectful of both student and faculty time.

F. Independent Research Project

The Independent Research Project is an independent exercise designed to help you further develop your ability to search for, identify, and critically evaluate relevant biomedical literature. The medical school accrediting body – the Liaison Committee on Medical Education (LCME), has identified lifelong, self-directed learning as an essential component of a medical education. Practicing these skills now is an important part of preparing you for clerkships and clinical practice, where you will be required to search and review the literature regularly.

The project is **due any time prior to August 22, 2025, at 5:00 p.m.**

It is recommended that you **review the Library lecture and the Scientific Method lecture prior to starting this project**. There are a vast array of powerful technologies and databases specific for medicine and basic medical sciences. These resources require practice to use efficiently.

Students will each select a disease or condition that interests them and then search the primary literature to identify **published studies regarding treatment of the disease**. Students need to focus on recently published, peer-reviewed literature directly addressing their question through clinical or basic science studies. The selected studies should be evaluated using the hierarchy of evidence (see: Scientific Method lecture). Two recent, high-quality publications need to be selected for completion of the project. That is, publications from 2023 – 2025 including meta-analysis, systematic reviews, randomized control trials or well-designed cohort or case control studies. Narrative review articles, case reports, and case series are not considered high-quality resources (more information below).

Each student needs to create a report containing the following information. A sample report is available in Sakai under Resources in a folder labeled Independent Research Project. **Reviewing the sample prior to completing the project will save you valuable time and effort**. It is not necessary to prepare long rationales or summaries.

1) Your name
2) Name of selected disease or condition
3) Search strategy including databases searched, filters used (if any), and search terms entered
4) Full citation and abstract of the two most relevant studies identified to address your question.
5) For each selected paper:
    a. Provide a brief rationale (2 or 3 statements) for why you selected the article as high-quality research
    b. Provide a brief summary (1 - 3 sentences) stating the key conclusions of the selected paper. Be brief. There is no need to list all findings or conclusions. *As you have not had statistics as part of your medical curriculum, you do NOT need to analyze the validity of the author's conclusions in terms of statistical analysis*.

The project can be completed at your convenience and submitted as a **PDF document** through Sakai. Feedback will be provided via Sakai. Sakai does not notify faculty when items are uploaded, and you may or may not be notified that feedback has been posted. If you have any concerns, please contact the Course Director.
The assignment will be assessed based the following criteria.

- Selected publications must be recent (2023, 2024, 2025). Rare diseases may be problematic due to an overall scarcity of literature, particularly high-quality recent publications.
- Selected publications must be from reputable medical journals or databases.
- **Selected publications must directly support treatment of the selected disease**
- Selected publications must be from "high-quality" resources as described above and in the **Scientific Methods** lecture.

- Assignments will be graded on a **PASS/FAIL** basis. Passing this assignment is required to pass the course.

- If a student fails to meet expectations for the assignment, they will be provided with feedback regarding the issues identified, and they will need to successfully remediate the project to pass the course and have their competency evaluations for the **Practice-Based Learning and Improvement competency** converted from a "Does not meet" to a "Meets with concerns".
- The timeline for resubmission of a failed project is flexible until the end of the course. Resubmissions should be discussed with the Course Director on a one-to-one basis.

G. Medical Genetics Project

The Medical Genetics Project is a small group exercise designed to give students additional exposure to searching the biomedical literature as well as identifying and critically evaluating relevant research works. The Medical Genetics Project is distinct from the Independent Research Project as students work together as a team to create an organized presentation to educate their peers and small group faculty facilitator(s) about their selected genetic disease. Each student must also submit an abstract and bibliography summarizing their findings in a clear and logical manner. The project is a graded component of the course.

The assignments for the Genetics Projects are spread throughout the course. During the first two weeks of class, your small group will select a **genetic disease** to study. If you need ideas, you can find many diseases in human genetics textbooks or on the Health Sciences Library's toolkit. You might choose a disease with a known genetic risk factor (e.g., a particular type of cancer) or choose from the list of possible diseases provided in the Genetics Project Resources available on MCBG Sakai. Feel free to select any genetic disease you and your group want to learn about and share with your peers. **As you will be presenting to three other groups, each group in your assigned small group room must select a different disease. Submit your disease selection through Sakai to reserve that topic**. Topics will be accepted on a first come, first serve basis. If your group duplicates a topic within your small group cluster, you will be asked to select a different disease.

Your selections should be submitted through Sakai Discussions in the folder labeled Genetic Projects Topics. Your selection needs to be submitted by **no later than Friday, August 15th at 5:00 p.m.** Only one member of your small group needs to submit the disease topic.

Each member of your small group must then select a different subtopic to focus on for their part of the research, abstract, and presentation. Although not all subtopics apply to all diseases, make sure that your group covers several of the following topics (which overlap somewhat): **disease etiology** (cause), **pathogenesis** (the mechanisms involved in disease development), **phenotype** (observable morphological, biochemical, and physiological characteristics of the individual, determined by a combination of genotype and environment), **natural history** (how the characteristics of the disease develop over time without treatment), **management** (activities aimed at improving the health and clinical outcomes of a patient with the disease, including self-management), **inheritance risk**, and **family, social, legal, and ethical issues** that relate to the specific disorder. While you will divide up the

subtopics among group members, **everyone should have a clear understanding of the disease etiology and mode of inheritance**. A Genetics Presentation Template is provided in Sakai under Resources in the folder Genetics Project Resources. The template includes ideas for organizing and approaching different subtopics.

Your group should prepare a unified PowerPoint presentation for September 3rd during small group. Presentations are informal but should be professional. Your PowerPoint slides do not need to be fancy or flashy; they need to convey the appropriate information clearly. Each group should present for approximately 20 - 25 minutes with each group member participating in the presentation. There will be 5 - 10 minutes for questions from your peers and facilitators before the next group will begin their presentation.

Each student must submit via MCBG Sakai Assignments

1. **a written abstract of your subtopic (approximately one-half page). Each student submits a unique abstract based on their research for the subtopic they will be presenting.**
2. **a bibliography of your most important 3-4 references. All references need to come from reliable sources, and 2 references must be from peer-reviewed primary literature (narrative reviews or case reports).**
3. **a copy of your small group's PowerPoint presentation**

The format of the abstract and bibliography should follow the example posted in Sakai under Resources in the folder Genetics Project Resources. **The abstract with a bibliography (PDF format only), and PowerPoint presentation must be submitted by 5:00 p.m. on September 3rd.**

Attendance is mandatory for the Genetics Project Presentations on September 3rd. It is not possible to make-up the in-person presentation, or the learning opportunity provided by listening to your peer's presentations. Excused absences will still be required to (1) participate in the group presentation by pre-recording their talk in Panopto, which will be played during the presentation and (2) submit the required abstract, bibliography, and PowerPoint files as stated above. In addition, students unable to attend the presentations will be required to review the PowerPoint presentations from the other three groups in their small group room and prepare a written summary of each presentation. **This written summary for absent students is due Monday, September 8th by 5:00 pm (submit to Dr. Foreman via email: kforema@luc.edu).**

The Genetics Project will be worth **8 points toward your final course grade (4%).** Four points will be based on your preparation for and participation in the Genetics Project presentation, as evaluated by your small group facilitators. Facilitators may recommend a lower grade for students who did not adequately prepare or did not participate sufficiently in the presentation or discussion. Four points will be based on the submitted abstract and appropriateness of the bibliography. Points will be deducted for late submissions. **If you have difficulty submitting your materials on time (internet is not working, power outage, etc.), you need to leave a voicemail for Dr. Foreman at 1-464-220-9850 describing the situation before the**

submission deadline. Those with legitimate issues for late submissions will be allowed to submit their materials to Maureen Locklund by 9:00 am the following morning (Sept. 4th) as either a printed document or on a flash drive. Satisfactory completion of the Medical Genetics Project will also be considered in the facilitator's written narrative at the end of the course. This assignment will also be considered when determining your competency in Medical Knowledge, Interpersonal and Communication Skills, and Practice-Based Learning and Improvement.

H. Self-Assessment Forms

Self-reflection is an important part of continuous performance improvement by physicians. Learning to effectively recognize and reflect on strengths, deficiencies, and personal biases and then act to implement changes to improve performance is central to Practice-Based Learning and Improvement. To begin developing self-reflection as a regular habit, we have four fillable Microsoft word documents for MCBG.

Form 1 is the Pre-course Self-Assessment and Goal-Setting Form. **You will need to download, complete the form and upload it to Sakai by 5:00 p.m. on August 5th.** This self-assessment will provide your faculty facilitators with information on your background knowledge, skills, and attitudes in the four core competencies related to our course.

Form 2 is a self-assessment on your small group performance and **Form 3** is an assessment of your entire small group and how you are working together as a team. **Both assessments should be downloaded, thoughtfully completed, and uploaded to Sakai Assignments no later than 5:00 p.m. on August 20th.** Toward the end of August, you will reassess your goals using **Form 4**: Midcourse Self-Assessment. **The completed form needs to be uploaded to Sakai by 5:00 p.m. on September 3rd**. **All forms must be submitted as PDF files**. Although you will not receive a grade for these self-assessments, they are an important learning tool for your journey to master the ideals underlying the Practice-Based Learning and Improvement competency. **Thoughtful completion and on-time submission of assessments will be considered when evaluating your competency in Practice-Based Learning and Improvement competency and Professionalism**. You can discuss these goals, or any issues related to small group with your facilitator(s) or the Course Director, Dr. Foreman, at any time.

MCBG Forms

Forms are available on Sakai for downloading.

Form 1: Pre-course Self-assessment and Goal Setting: to be completed by each student and submitted through Sakai by 5:00 p.m. on August 5th. This form provides essential background information for your facilitators.

Form 2: Small Group Assessment, self-assessment: to be completed by each student submitted through Sakai by 5:00 p.m. on August 20th.

Form 3: Small Group Assessment, small group version: to be completed by each student submitted through Sakai by 5:00 p.m. on August 20th.

Form 4: Midcourse Self-assessment: to be completed by each student and submitted through Sakai by 5:00 p.m. on Sept. 3rd. This form is a student reflection on accomplish of their personal course-related goals for MCBG.

Form 5: Criteria for Student Evaluations: positive and negative attributes to aid facilitators in preparing student evaluations.

Form 6: MCGB Small Group Member Feedback from Facilitator: to be completed by facilitator and used as a basis for discussion at one-on-one meetings.

III. EXAM FORMAT

A. There will be three exams given in this course. Each exam covers approximately two weeks of material.
August 18 – Exam 1
September 5 – Exam 2
September 24 – Exam 3

B. The total number of questions on each exam will vary, but the number is roughly calculated as 4 multiple choice questions per scheduled lecture hour for new material and 1-2 questions per lecture from prior material.
Exam 1 ~56 questions (1 pt. each)
Exam 2 ~76 questions (1 pt. each)
Exam 3 ~90 questions (1 pt. each)

C. Exams will be cumulative *in lieu* of a fourth comprehensive final exam. Material will be re-tested only once. Thus, Exam 1 material will be re-tested on Exam 2, but not Exam 3. Exam 2 material will be re-tested on Exam 3. You are strongly encouraged to routinely review previous material throughout the course to aid in your retention of the material for the next exam and for the United States Medical Licensing Exam (USMLE-Step 1).

D. The number of exam questions is calculated as 4 questions per scheduled lecture hour. For exam 2, there will be 1-2 questions per lecture from exam 1 material and for exam 3, there will be 1-2 questions per lecture from exam 2 material. Slight variations in the number of questions on an exam may occur.

E. All exam questions will be multiple choice format in the single best answer style of the USMLE-Step 1. Total time allowed for each exam will vary depending on the number of exam questions - the average time allotted to answer each question will be 1 minute 45 seconds. The total time is then rounded up to the next convenient number. Note: time allotted during USMLE-Step 1 is 1 minute 20 second / question. Future courses will decrease your allotted time per question to help prepare you for USMLE-Step 1.

F. All questions will be directly linked to a specific learning objective.

G. MCBG Policy for disputing exam questions is as follows:
1. Email the Course Director ASAP after you have finished your exam, prior to 3:00 p.m. on the day of the exam. We will not release exam grades until any disputes have been identified, investigated, and finalized.
2. Clearly describe the question and your concerns. Please provide enough detail for the question to be identified. The number of the question is not helpful because the questions are randomized on each computer. Usually, a few key details are enough to find the right question. When describing your concerns, be professional.
3. All disputes will be answered in writing.
4. Concerning questions will be discussed with the involved Lecturer and with the Associate Dean of Biomedical and Translational Sciences. Decisions are final.

H. After each exam is finalized, you will receive back a report including your exam score and a list of the learning objectives linked to the questions that you answered incorrectly. This list should serve as the basis for re-reviewing course content to ensure your full understanding of course concepts and content for the future.

I. Students are not permitted to review their exams per Stritch School of Medicine policy. MCBG abides by this policy.

IV. EXAM SCHEDULING AND MISSED EXAM POLICY

All students are expected to sit for each exam at the date and time indicated in the course schedule, as documented in the SSOM Academic Policy Manual. If circumstances arise that may prevent you from taking a scheduled examination (e.g., serious illness or an emergency situation) you should immediately contact **BOTH** the Course Administrator (Maureen Locklund) **AND** the Office of Student Affairs as soon as possible, so that a timely determination can be made regarding a potential excused absence. Students who are unable to sit for an exam for a **legitimate** reason, as adjudicated by the Office of Student Affairs, will have their exam rescheduled for a later date. The rescheduling of any exams will be determined by mutual agreement of the Office of Student Affairs, the Office of Educational Affairs, and the Course Director, as outlined in the SSOM Academic Policy Manual.

V. COURSE GRADING AND COMPETENCY EVALUATION POLICY.

A. MCBG Requirements, Grading and Competency Evaluation

1. Medical Knowledge Grading and Competency

Medical Knowledge will be assessed and graded through the three multiple choice examinations, and successful completion of the Medical Genetics Project. The final grade will be based on the number of correctly answered questions on all exam assessments delivered during the course plus the Genetics Project score divided by total number of questions on all exams plus total possible points for Genetic Project with the result expressed as a percentage.

Grading will be on a Pass / Fail basis. Scores will not be rounded

Pass: an aggregate percentage score **greater than or equal to 70.0%**
Fail: an aggregate percentage score of **less than 70.0%**.

In addition, students will also receive an evaluation for the medical knowledge competency, which reflects the extent to which they are meeting the expectations of the competency. These competency evaluations do not appear on the official transcript but do form part of a students' official SSOM academic record and are reviewed, and potentially acted upon, by the Student Promotions Committee when considering fulfillment of SSOM competencies for the purpose of determining student promotion and graduation decisions, as outlined in the SSOM Academic Policy Manual

Medical knowledge competency evaluations are determined as follows:

"Does not meet" - students who receive a failing grade for the course

"Meets with concerns" - students who achieve a pass, but whose final aggregate percent score is less than 1.65 SD below the class mean (i.e., within the lower 5% of the class).

"Meets expectations" - students who achieve a pass and whose final aggregate percent score is > the class mean minus 1.65 SD.

2. Interpersonal and Communication Skills Competency

The Interpersonal and Communications Skills competency will be assessed by your facilitators based on your participation in the Small Group Problem Solving Sessions and the Genetics Project presentation. The evaluations are determined as follows:

"Does not meet" - students who do not participate in Small Group Problem Solving Session due to recurrent unexcused absences or lack of active participation in discussions as determined by their Small Group facilitation team. Unexcused absences from the Genetics Projects presentation will also be taken into consideration.

"Meets with concerns" – students who show a lack of active participation in small group problem solving sessions that is concerning to the facilitation team.

"Meets expectations" – students who are active participants in the small group learning process including the Genetics Project presentation.

3. Practice-Based Learning and Improvement Competency

Practice-based Learning and Improvement competency will be assessed through the four self-assessment assignments, the abstract and bibliography portion on the Genetics Project, and the Independent Research Project. Positive responses to concerning feedback from the facilitator will be considered as evidence of student actively addressing deficiencies in a productive manner.

"Does not meet" - students who fail to turn 3 or more of the 6 assignments on time, or whose work demonstrates disregard for the goals of the project. Ignoring facilitator feedback regarding deficiencies noted by the facilitation team and brought to the attention of the student.

"Meets with concerns" – students who fail to turn in 2 assignments on time, or whose work demonstrates lack of care and concern toward accomplishing the goals of the project. Ignoring facilitator feedback regarding deficiencies noted by the facilitation team and brought to the attention of the student.

"Meets expectations" – students who strive to perform solid work through thoughtful completion of assignments, on time submissions, and attempt to improve deficiencies identified by and brought to their attention by their facilitation team.

Note: Students who initially receive a failing grade, but then successfully remediate will have their competency evaluations for the **Practice-Based Learning and Improvement competency** converted from "Does not meet" to "Meets with concerns"

These competency evaluations do not appear on the official transcript but do form part of a students' official SSOM academic record and are reviewed, and potentially acted upon, by the Student Promotions Committee when considering fulfillment of SSOM competencies for the purpose of determining student promotion and graduation decisions, as outlined in the SSOM Academic Policy Manual.

4. Professionalism Competency

Students who exhibit behaviors within the course that fall below the standards expected of a Stritch student will receive either a "Does not meet" or a "Meets with concerns" for their professionalism competency, depending upon the extent and seriousness of the behavior. Students that receive either outcome in their Professionalism competency will be subject to the review and subsequent actions of the Student Promotions Committee (SPC), as outlined in the SSOM Academic Policy Manual. Please note that any reported professionalism concerns could ultimately affect the content of your MSPE (Dean's letter).

VI. MEDICAL KNOWLEDGE EXAM REMEDIATION POLICY

Students who fail to achieve the minimum score required for a passing grade in the medical knowledge assessments for MCBG may be allowed the opportunity to take a make-up remediation exam, as outlined in the SSOM Academic Policy Manual. The purpose of the remediation exam is for the student to demonstrate competence of the material presented in the course. The make-up exam will be a rigorous, yet fair assessment, to ensure that the student has achieved sufficient mastery of the course content to be allowed to progress to the next academic level. The composition of the exam will be determined by the Course Director, together with faculty input, and will consist of representative fair and validated questions that asses critical understanding of core course concepts and high yield course content that reflects the breadth of material presented throughout the course. The MCBG remediation exam will be held approximately three weeks after the end of the school year in May, with the date

scheduled by the Office of Student Affairs and the Academic Center for Excellence in consultation with the Office of Educational Affairs. Students needing to remediate more than course should meet with the Office of Student Affairs and the Academic Center for Excellence to discuss their individual situation and devise a testing schedule that allows adequate preparation time for each exam.

All students requiring remediation should meet with the Course Director well in advance of the scheduled date of the exam to discuss both the format of the exam and their proposed study approach. Those students achieving a score of **greater or equal to 70%** on the remediation exam will have their initial F grade converted to a P* and the "Does not Meet" for their Medical Knowledge competency altered to "Meets with Concerns". Students who fail to successfully achieve the minimum passing score will be required either to repeat the course in its entirety during the subsequent academic year, or alternatively, may be subject to automatic administrative action by the Medical School, as outlined in the SSOM Academic Policy Manual.

Please note that students with a **final aggregate course score of <60% may be denied the opportunity to remediate** their course failure by an end-of-year remediation exam and may instead be required to repeat the course in its entirety. The decision to allow such students the opportunity to take a remediation exam will be made by the Student Promotions Committee (SPC) following a recommendation provided by the Course Director.

VII. PROFESSIONALISM.

Personal responsibility and professionalism are two key areas in the development of a physician. It is expected that professionalism will be extended in all aspects of your conduct in this course.

Appropriate professional behavior includes, but is not limited to the following:

- Adopting appropriate, professional, and respectful interactions with the Course Director(s), lecturers, medical educational coordinators, and other students, including when communicating via email.
- Responding to direct communication from the Course Director(s) in a timely fashion, particularly in circumstances when a face-to face meeting is requested to discuss issues related to academic performance.
- Attendance and participation in all required course sessions (unless an official excused absence has been granted by the Office of Student Affairs)
- Adopting appropriate and professional behavior during all course activities
- Completion and submission of any required course assignment by the designated submission date (including end-of-course-evaluations)
- Honestly completing course examinations without attempting to seek an advantage by unfair means and without attempting to compromise the integrity of the exam process in any way.

Any lack in professional conduct during the course will be noted in the online Professionalism reporting tool and an appropriate designation and narrative comment

made to the Professionalism competency evaluation within the student grading system. In such cases, students will be subject to the review and subsequent actions of the Student Promotions Committee (SPC), as outlined in the SSOM Academic Policy Manual.

You are training to be physicians and both we and society expect you to hold yourself to the highest professional and ethical standards.

VIII. ACADEMIC HONESTY

It is expected that all students will maintain personal integrity and honesty during the examination process.

Specifically, we do not expect you to participate in and/or enable any of the following:

- the unauthorized access and use of any materials, notes, sources of information, study aids or tools during the exam.
- the assistance of any individual to help answer a question.
- the use of any internet enabled device to search for answers during the exam.
- helping another student commit an act of academic dishonesty.
- engage in any activity aimed at compromising the integrity of course exams either in this or future academic years.

Any student that attempts to gain an unfair advantage over other students in an examination by any of these unauthorized means, passes on the details of exam questions to any other student, will be guilty of academic misconduct and will receive a “Does not meet” in their professionalism competency and be promptly reported to the Office of Student Affairs for subsequent action.

Any written work submitted as part of a course requirement should represent the students own work and should not be plagiarized from other sources. **Specifically, use of any AI-enabled software (e.g., ChatGPT) to complete any required course written assignment is not permitted.** Any student found to be engaging in such activities will be guilty of academic dishonesty and will receive a “Does not meet” in their professionalism competency and will be promptly reported to the Office of Student Affairs for subsequent action.

IX. IMPORTANT DATES

Aug. 5:	First day of class. Submit completed Form 1 in Sakai by 5:00 p.m.
Aug. 15	Deadline for selecting a disease for the Genetics Project. Submit your selection through Sakai by 5:00 p.m.
Aug. 18:	Exam 1
Aug. 19:	Deadline for signing up for required individual meetings with Small Group facilitators.
Aug. 20:	Submit completed Forms 2 and 3 in Sakai by 5:00 p.m.
Aug. 22:	Submit MCBG Independent Research Assignment through Sakai by 5:00 p.m.

Sept. 3: Submit completed Form 4 through Sakai prior to 5:00 p.m.
Sept. 3: Genetics Project. Each student must submit an abstract, bibliography and the group PowerPoint presentation through Sakai by 5:00 p.m.
Sept. 5: Exam 2
Sept. 23: Exam 3

X. TEXTBOOKS

Recommended: These texts are used for reading assignments.

Alberts, B. et al. (2022). **Molecular Biology of the Cell, 7th ed**. Garland Science, ISBN 978-0-8153-4432-2. Hardcover copies are available in the library and the Academic Center for Excellence.

Devlin, T. (2011). **Textbook of Biochemistry with Clinical Correlations**, 7th ed. Wiley Publications. ISBN 978-0-470-28173-4. Reserve copies available in the library.

Nussbaum, R., McInnes, R.R., Willard, H.F. (2016). **Thompson and Thompson Genetics in Medicine, 8th ed**. Elsevier. ISBN 978-1-4377-0696-3. E-Book available for 7th and 8th editions through the library website.

Alternative texts include:
Alberts, B. et. al. (2015) **Molecular Biology of the Cell, 6th ed**. Garland Science, ISBN 978-0815341055 For many, but not all chapters, the 6th edition is similar to the 7th edition.

Meisenberg, G. & Simmons, W.H. (2017). **Principles of Medical Biochemistry**. 4th ed. Elsevier. ISBN 978-0-323-29616-8.
Available as an E-Book through the library website.

Schaaf, C.P., Zschocke, J., Potocki, L. (2012**). Human Genetics: from Molecules to Medicine.** Lippincott. ISBN 10-1-6083-1671-8.
Available as E-Book through the library website.

XI. FACULTY AND COURSE EVALUATIONS

Medical student feedback is essential to continuous quality improvement, and all **students are required to complete an evaluation of the course, lecturers, and their small group facilitators.** Evaluations of facilitators and lecturing faculty can be completed at any time throughout the course. Course content evaluations can be completed during the two weeks before and after the final exam. Students are expected to complete the evaluations in a professional and constructive manner.

XII. MCBG SAKAI SITE

Sakai will be used as the primary mechanism for providing course materials, collecting student assignments, and communicating with the class. It also hosts an online discussion forum for student questions and faculty responses. Sakai can be accessed

using the menu at the bottom of the LUMEN homepage or through the MCBG Homepage under Educational Resources or through this link: https://sakai.luc.edu/. Login using your Loyola username and password is required.

The MCBG Sakai site is organized into the following sections:
Overview: landing page for MCBG

Course Information: contains general course information including the Course Description, MCBG Goals and Objectives, and resources for the Genetics Project and the Independent Research Project.

Course Description: this document

Announcements: a chronological listing of all course announcements. As all announcements to the M1 class will be made through Sakai, **we strongly urge all students to review each announcement as it is released**.

Resources: contains practice problem sets, resources for the Independent Research Project and the Genetics Project followed by folders corresponding to each lecture. Each lecture folder contains all small group related materials, and any supplemental materials provided by the lecturer to enhance your understanding. Unless specifically stated otherwise by the lecturer, any supplemental materials are not tested. Note that the folders may look empty until the small group problem set is released 15 minutes prior to the small group problem solving session. Later that afternoon, the facilitator guide and any recap slides will be added to the folder. These resources are automatically released on a timer making them invisible until their scheduled release.

Session Materials contains a chronological list of lectures, small groups and recap sessions. Icons will be shown when a lecture slide set, or handout is available for download. The Panopto video is available in the last column where it says Uploaded Video: View. Regardless of the time listed on the Lumen calendar, if the video has been uploaded, it is available for you to watch.

Discussions: an online discussion tool. Inside Discussions, you will find a folder for Genetics Project Topics where one student from each group will indicate the disease topic their group will present for the Genetics Project. The other folders are either general discussions or the name of each lecture. Students are encouraged to post their questions on the corresponding lecture, which will be answered by a faculty member. Students are welcome to add their thoughts to the discussion as well.

The Discussions Forum is the preferred method of asking a question as the question and answer can benefit all students. If you have a question, at least 10 other students in the class have the same question. Initiating a vibrant discussion between students and faculty is a win-win situation. Faculty on the Health Sciences Campus only use Sakai for their teaching in the medical school. This means they are only using the system a few times a year and are not used to looking at it regularly. If your question is not answered in 24 hours, either email the lecturer to tell them a question is waiting

or email Dr. Foreman or Ms. Locklund, and we will email the lecturer. A reminder is welcome and appreciated.

Assignments: contains various assignments that you will need to complete. When submission is available, you will be provided with a place to upload your PDF documents.

SSOM Calendar: official calendar for the medical school. Please check the calendar regularly, or if you download the information to a different calendar you prefer to use, confirm that your calendar is updating as changes are made to the SSOM calendar.

If you click on a particular MCBG lecture in the SSOM calendar, you can download the associated lecture slide set, the handout and/or view the pre-recorded video. If you click on a recap or review session, a box will open on the right containing the in-house recording of that event in half-hour increments. The SSOM Calendar is the only location where you can access in-house lecture room recordings.

The 7th edition of Alberts Molecular Biology of the Cell textbook was published through Norton Publishers. They have required us to place a link in the MCBG Sakai website so that students can go directly to Norton to purchase their copy of the text. This requirement allows us to utilize the figures from the text in our lectures and handouts for the class. If you plan on purchasing the text, there is absolutely no pressure to purchase through Norton. We are simply required to provide the option in order to have permission to re-produce figures from the text.

XIII. KEY CONTACTS

COURSE DIRECTOR

Name: Kimberly Foreman, PhD
Associate Professor of Cancer Biology
Location: Cancer Center Rm 235

Email – kforema@luc.edu

ASSISTANT COURSE DIRECTOR

Name: Maurizio Bocchetta, PhD
Associate Professor of Cancer Biology
Location: Cancer Center Rm 204

Email - mbocche@luc.edu

MEDICAL EDUCATION COORDINATOR

Name: Maureen Locklund
Location: SSOM Rm 310

Email – mlocklund@luc.edu

FACULTY: COURSE LECTURERS

A note about e-mail addresses: Loyola University Chicago changed their policy regarding assignment of e-mail addresses several years ago. The current policy (first initial, full last name plus an optional number for common names) was **NOT** the policy in the past. **Many of your professors have e-mail addresses with truncated last names**. Please do not assume that you know the correct e-mail address based on current standards. Generally speaking, e-mail is the best way to contact faculty.

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17. SMALL GROUP PROBLEM-SOLVING SESSIONS: ROOMS AND FACILITATORS

Room 1 (160E) – Kimberly Foreman, Ph.D., Olha Karaman, Ph.D., Michael Nishimura, Ph.D.

Room 2 (160W) – Maurizio Bocchetta, Ph.D., Mashkoor Choudhry, Ph.D., Walter Jeske, Ph.D., David Rademacher, Ph.D.

Room 3 (340) – Steve Kregel, Ph.D. Jonathan Rennhack, Ph.D., Michael Zilliox, Ph.D.

Room 4 (345) – Mitchell Denning, Ph.D., Rocco Gogliotti, Ph.D., Irida Kastrati, Ph.D., Jiwang Zhang, M.D., Ph.D.

Room 5 (350) – Edward Campbell, Ph.D., Sean Fanning, Ph.D., Susan Uprichard, Ph.D.

Room 6 (370) – Jon Allen, Ph.D., Ari Vaziri-Gohar, Ph.D., Karen Visick, Ph.D.

Room 7 (375) – John Callaci, Ph.D., Celeste Greer, Ph.D., Eva Murdoch, Ph.D., Sophia Zang, Ph.D.

Room 8 (380) – Neil Clipstone, Ph.D., James Ji, Ph.D., Robert Fryzstak, Ph.D.,