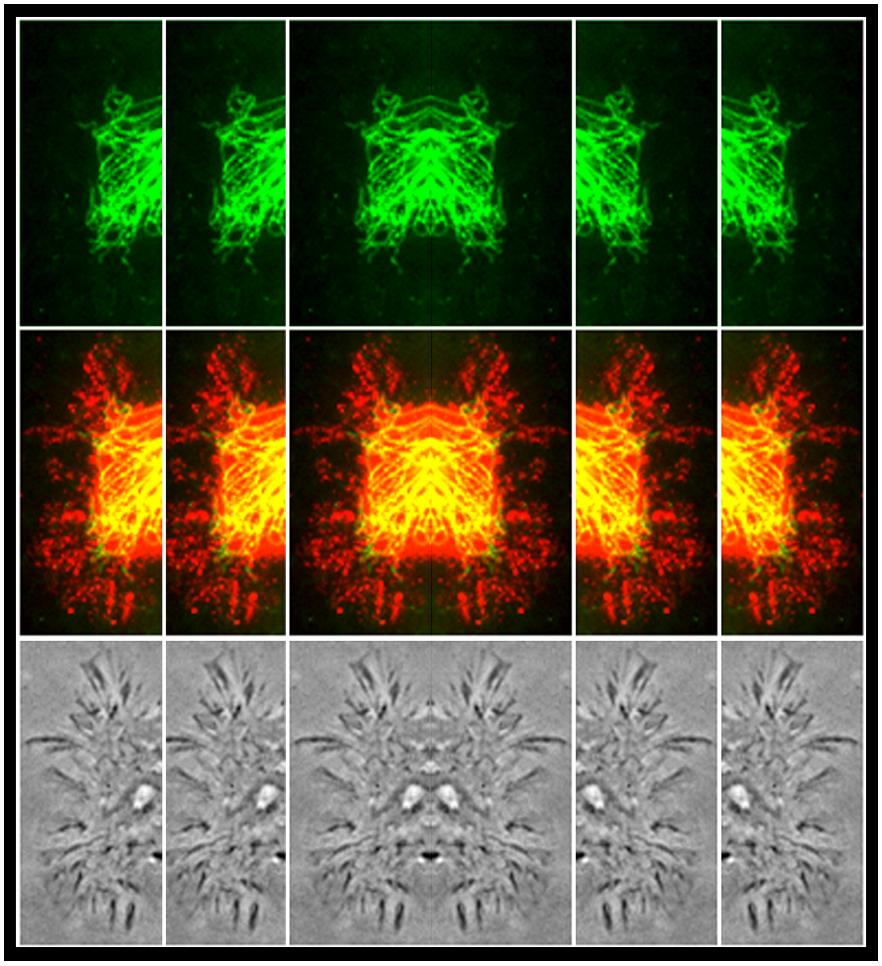
RUTGERS

Graduate School of
Biomedical Sciences

BASIC HISTOLOGY

Fall 2025



Course Director: Virgil Muresan, Ph.D.

BASIC HISTOLOGY – CBMM N5001
Fall 2025

COURSE DESCRIPTION:

This course is designed for graduate students in biomedical sciences, and for students (such as biology teachers, laboratory technicians, or graduate students in research) whose work requires knowledge of the organization of human tissues and organs, and examination of tissue sections. The course is designed for Masters students, as well as doctoral and medical students.

Basic Histology begins with a brief introduction to histological methods for light and electron microscopy, and describes the general principles of immunocytochemistry, transmission electron microscopy (TEM), and scanning electron microscopy (SEM). The course then discusses the characteristic morphologies of various cell types, cellular arrangements that form the four primary tissues (epithelium, connective tissue – which includes adipose tissue, cartilage, bone, and blood -, muscle, nerve), and the microscopic structure of major organs within organ systems. The aim of this course is to provide students with the knowledge and skills needed to identify and describe the microscopic anatomy of various organs, with attention to the arrangement of the primary tissues within each organ. There will be extensive discussion of structure-function relationships. Although the details of mechanisms involved in these functions and in pathological processes are outside the scope of this course, some reference will be made for interest in the broader perspective of medical science.

Credits for CBMM N5001: This is a 3-credit course. College Biology is a prerequisite.

COURSE OBJECTIVES:

The course is designed to provide graduate students with a solid foundation in basic histology. In addition, it will prepare students for learning in other disciplines that will follow in their graduate studies.

At the conclusion of this course students will be able to:

- Understand, and become familiar with, the basic principles of cell biology
- Identify the main cell types in the four basic tissues and organs of the human body, and correlate structure with function
- Identify and describe the extracellular matrix in the four basic tissues
- Identify the intracellular structures and organelles in light and electron micrographs
- Understand the relationship between tissues and organs that make up the human body
- Understand how the altered structure and function of cells, tissues, and organs may lead to pathology
- Develop skills to understand articles published in biomedical journals

COURSE FORMAT:

Class format will include **Lecture Presentations** accompanied by demonstration of various tissue sections by the instructor. After discussion of lecture material, students will be able to view tissue sections of the region of interest using **Virtual Microscopy (VM)**. In VM, glass slides previously scanned at high resolution are viewed on a computer monitor and selected regions

of interest can be viewed at higher magnification. Each student is required to have his/her own computer, or access to a computer. **Team-based learning (TBL)** will also be employed, although this format will be adapted to **Independent Study**, due to remote exam conditions (see below). Both VM and TBL should increase comprehension and knowledge retention due to employment of independent AND collaborative learning. The course will be given in a hybrid format. Lectures will be given live, and students will be able to attend the lectures in-person, in the classroom. However, students who want to take the course entirely remotely will be able to do so, because the lectures will be simultaneously broadcasted over the internet, via Zoom, with the Chat function enabled. In addition, all lectures and VM presentations will be recorded, and all students will be able to access them in the NJMS Education Portal. All students will take all exams on their computers, remotely or at the campus.

The course website is accessible in **Canvas**, and students are asked to make sure that they can access it (with Rutgers Username and Password). The login page for Canvas is at: https://canvas.rutgers.edu/

To succeed in Basic Histology, students need to study visual material (illustrations, diagrams, photographs, micrographs) and capture mental images. Acquisition of a good repertoire of mental images and their translation into three-dimensional concepts can be achieved through careful and repeated observation of textbook and VM images.

The course will have 15 evening sessions, once per week, for 3 hours each session.

Session Time and Location

Thursdays 6:00-8:50 pm. Location: MSB, B-619 (may change to B-610), and online via Zoom. All lectures will be recorded and made available to the students (see below).

FACULTY AND STAFF:

FACULTY	DEPARTMENT	OFFICE	PHONE	E-MAIL ADDRESS
Virgil Muresan, Teacher	Pharmacology, Physiology and Neuroscience	MSB, I-685	973-972-0573 908-723-1006 (cell)	muresavi@njms.rutgers.edu
Alison Kiasaleh, Teaching Assistant	School of Graduate Studies			ak2873@gsbs.rutgers.edu

Tutors may be assigned to help students in this course.

COURSE TEXTBOOKS:

- Ovalle WK and Nahirney PC. (2021) Netter's Essential Histology, 3nd ed. Saunders, Elsevier. ISBN 9780323694643. **This is the course textbook.** Rutgers George F. Smith

Library of Health Sciences (http://www.libraries.rutgers.edu/smith) has the book available at Library Resources, under eBooks A-Z.

Accessible at (cut and paste URL):

https://www-clinicalkey-com.proxy.libraries.rutgers.edu/#!/browse/book/3-s2.0-C20180016448

- Mescher AL. (2024) Junqueira's Basic Histology – Text & Atlas, 17e. McGraw Hill Education, ISBN 978-1-264-93039-5. This is a freely accessible resource, complementing – but not replacing - the textbook.

  Accessible at (cut and paste URL):

https://accessmedicine-mhmedical-com.proxy.libraries.rutgers.edu/book.aspx?bookid=3390

EVALUATION METHODS & COURSE GRADING

Assessment/Evaluation:

Exams: Exams will be administered remotely, with remote proctoring. Each exam will consist of 25 practical (with A and B parts) and 40 didactical questions. Practical questions will be based mainly on slides from VM labs, and didactical questions will be multiple choice (primarily), matching, fill-in-the blank, short essays, based mainly on lecture material. Students may not use books, notes, or electronic devices (including computers, calculators, cell phones, players, etc.) during the online exams. Students should take the exams individually; they may not communicate with each other during the exams, and may not take the exams in groups. Details on the remote administration of the exams will be provided in time.

TBL Session and Quiz: TBL sessions are based on a series of learning assignments, which are derived from the textbooks. Students are only responsible for viewing the figures and reading the associated text that are specified in the learning assignments for that TBL. Each student must be fully prepared for the TBL sessions, having studied the assignments prior to each TBL session.

TBL Session Format: TBL sessions are difficult to conduct remotely. Because of this, TBL sessions will be replaced by sessions of Independent Study, where students will prepare for the quizzes without the Instructor giving a lecture. The students will study from the textbooks and Virtual Microscope images, based on specific Assignments that are made available two weeks in advance of the TBL session. A short review of the learning issues may – or may not - be done by the Instructor one week before the TBL session. At the time of the TBL session, students will take a short INDIVIDUAL quiz (10-20 questions) that addresses the session's learning objectives. The quiz will become available on the course website in Canvas at the start of the TBL session.

Students will have the chance to retake the quiz after a short, 20 minutes, break, during which they are allowed to consult textbooks.

Grading for the TBL Sessions: Both quizzes will be graded. The final grade for each TBL session will be the mean of the two grades.

Additional instructions for TBL sessions will be given two weeks prior to the TBL session. The format of the TBL sessions may change.

Estimation of Weighted Course Average

- Exam I (Mid-Term) (lecture & lab practical components) 45%
- Exam II (Final) (lecture & lab practical components) 45%
- 2 Team-Based Learning (or Independent Study) Assessments (5% each) 10%

The course does not offer mechanisms for grade improvement. However, the significant improvement of a student's performance in the second part of the course is positively valued and may serve – at the discretion of the Course Director - as basis for an increase of the grade (e.g., from C+ to B).

Course Grading:

Valid letter grades and their values are:

Letter Grade	Numerical Scores
A	90 - 100**
B+	85 - 89**
B	80 - 84**
C+	75 - 79**
C	70 - 74**
F	< 69**

**for calculation of final course grades, decimal values are rounded up to the next whole number if .5 or above OR rounded down to the whole number if below .5, e.g., 89.5 would be an "A" and 89.4 would be a "B+."

End of Course Evaluation

At the end of the course, students are asked to complete an Evaluation of the course and of the teaching faculty. The Evaluation Questionnaires are available in the Education Management System of the Education Portal. Students will need to complete the Evaluations in order to access their Final Grade in the course. **If you liked the course and how it was taught – or if you did not - PLEASE complete the evaluation**.

EDUCATION PORTAL AND CANVAS COURSE ACCESS:

The CANVAS course website is an essential part of the Basic Histology Course. CANVAS can be accessed using the Educational Portal website at https://ep.njms.rutgers.edu . The Education Portal provides single sign-on and "one stop shopping" site for various academic systems such as CANVAS, Education Management System, Digital Media Portal, Virtual Microscopy, SOCRATES, etc.

If the Education Portal is unavailable, direct links for CANVAS, NJMS Video, Virtual Microscopy etc., are provided below:

CANVAS: To access all course information log onto CANVAS at: https://canvas.rutgers.edu/
The course website is an integral component of Basic Histology. In addition to course material, the website will contain information concerning the administration and operation of the course (e.g., syllabus) and will provide links to the VM image database and other useful information. Course announcements, including emergency procedures, will be displayed on the homepage.

VIRTUAL MICROSCOPY ACCESS: VM slides can be accessed at https://ep.njms.rutgers.edu/ using your core username and password. Please refer to your lab guide and lecture materials for more detailed information about how to view and study the images in your virtual slide box.

PODCAST ACCESS: Please see NJMS_SGS Digital Media - Site instructions.pdf document, provided in the first module of the course in CANVAS. Typically, recordings will be available in the Kaltura Course Gallery and in YuJa.

WIRELESS ACCESS FOR ELECTRONIC EXAMS (ON CAMPUS EXAMS)

RU Health Sciences is the primary wireless network for SGS however you can use either **RU Health Sciences** or RU Wireless Secure for electronic exams. Please make sure you can connect to both prior to an exam. See https://ruwireless.rutgers.edu/ruwireless-secure for more information. **DO NOT USE RU Wireless.**

Important: Accepted file formats for exams and TBL Quizzes are: Microsoft Word documents and pdf files. Scanned documents are also accepted, if they are sent as normal attachments.

Important: Files should NOT be attached to e-mail messages via OneDrive or otherwise embedded in the message. Regular attachments should be used.

EXAMSOFT SYSTEM REQUIREMENTS: EXAMSOFT is not used in this course.

ABSENCE FROM COURSE QUIZZES AND EXAMS:

SGS has issued a **MISSED EXAM POLICY** for students enrolled in their programs. Below are the valid excuses for missing a quiz or exam in this course (verbatim from the SGS Exam Policy):

1) Significant illness, with official note by doctor, which must include a valid reason for missing the exam. The doctor's note cannot result from a remote (online) diagnosis. NOTE: Illness prior to the exam ("didn't have time to study") does not constitute a valid excuse, although exceptions can be given by the SGS Associate Dean of Student Affairs if the prior illness has been severe or lengthy.
2) Death in the immediate family (parents, siblings, children, grandparents, aunts/uncles, niece or nephew, sister-in-law or brother-in-law, parents-in-law, first-cousins). Verification, with dates, is required, but this can be a newspaper announcement, event (e.g. wake) announcement, etc.
3) Medical/dental school interview, in which the interview or unavoidable travel overlaps with the exam. Copy of the invitation letter.
4) Presentation at a meeting. Proof of attendance required.
5) More than two final exams on the same day. (NOTE: An exam should not be rescheduled for an individual with two exams on the same day). If a student has more than two exams on the same day, they will need to contact the SGS Associate Dean of Student Affairs, who will contact the course directors about allowing the student to take one of the exams on a different day. The vast majority of schools across the country, including Rutgers New Brunswick, allow up to two final exam in the same day.
6) Permission of SGS Associate Dean of Students Affairs, with consultation of course-director. This will be rare, but is meant to account for valid, but unforeseen circumstances.

Each of these reasons will require some form of documentation to be submitted to verify the absence. For the full policy, please follow this link:

http://njms.rutgers.edu/sgs/current_students/docs/new/ExamPolicy.pdf

CODE OF PROFESSIONAL CONDUCT (COURSE EXAMINATIONS):

All students have a fundamental responsibility for maintaining academic integrity and intellectual honesty in their academic and professional endeavors. They are expected to observe generally accepted principles of scholarly work, to submit their own rather than another's work, to refrain from falsifying data, to acknowledge the published work of others in an appropriate manner, and to refrain from receiving or giving aid during examinations or other work requiring independent effort. When submitting written material, students take full responsibility for the originality of all work not otherwise identified by appropriate

acknowledgments and imply that both the ideas and words used are their own. All students are expected to respect the property of faculty and other students, and not use research equipment or laboratory supplies of others without permission.

Specific examples of appropriate behavior in examinations exams are given below:

Examinations: The purpose of an examination is to assess a student's knowledge of a topic defined within a course or courses. **Unless given explicit written instructions to the contrary, a student must work without assistance on an examination.**

- **Classroom examination:** Each student will provide answers to questions as directed. Unless otherwise stated, no material (books, calculators, computers, communication devices) of any kind can be used during an examination.
- **Take-home examination:** Each student will provide answers as directed. Unless otherwise stated, research and writing must be done individually without assistance or exchange of information with others. The ability to use source material in the research of answers will be defined for each examination. But, unless stated otherwise, all source material should be cited appropriately as outlined below.

NOTE: THESE POLICIES ALSO HOLD TRUE FOR ALL EXAMS ADMINISTERED REMOTELY.

To view the full policy for the Code of Professional Conduct in the School of Graduate studies regarding examinations, research and oral presentations follow this link:

http://njms.rutgers.edu/sgs/current_students/ac_integ.php

ACADEMIC WARNING POLICY:

http://njms.rutgers.edu/sgs/documents/policys/SGS_Academic_Warning_Policy.pdf

Each program shall clearly inform students of the criteria for satisfactory academic performance. Academic standing will be reviewed each semester by the Program's Academic Standing Committee. Students who receive less than an average grade of "B" in the designated Core course(s) or have a GPA less than 3.0 will receive an academic warning notice. Students performing below satisfactory levels of proficiency as outlined by the program may also receive a written warning notice. The written warning states the problem(s), outlines those measures needed for improvement and sets a deadline for compliance. Letters informing students of an academic warning will be sent within 30 calendar days of the end of the semester. A request will be made to students receiving academic warning letters to meet with the Program Director and/or the Academic Standing Committee.

COURSE ADD/DROP POLICY:

Policy for the Addition of a Course:

Students may add courses with the approval of the instructor (when required) and the program director. A student wishing to add a course after the general registration period has closed, must complete the "Add/Drop/Withdraw" form and have appropriate approval of the course instructor (when required) and program director prior to the start of the course. Registration will not be permitted beyond the first week of a course. Credit will not be given for courses in which the student was not registered.

Add Course Form Link:

https://na2.docusign.net/Member/PowerFormSigning.aspx?PowerFormId=96fcae95-bc67-45fb-8da3-11300ded2e99

Policy for Dropping a Course:

Students may drop courses with approval of the instructor (when required) and the program director. Students submitting a completed "Add/Drop/withdraw" form to the SGS Registrar's office within 10 academic days of the start of the course will receive a full tuition refund and the course will not appear on their official transcript. The drop period of 1-10 *academic days, is distinguishable from the withdrawal period in that the drop period is without penalty. A completed and approved Add/Drop/Withdraw" form(s) must be received by the Registrar's office within the time periods set forth above in order for a course(s) to be "dropped".

Drop Course Form Link:

https://na2.docusign.net/Member/PowerFormSigning.aspx?PowerFormId=c45635ca-6a1e-4936-b436-337b211b8433

***An academic day is defined as a day that the SGS campus at which the student is enrolled is open for business.**

REASONABLE ACCOMMODATIONS AT RUTGERS SCHOOL OF GRADUATE STUDIES:

Rutgers School of Graduate Studies is committed to providing equitable access to learning opportunities to students with documented disabilities (e.g. mental health, attentional, learning, chronic health, sensory, or physical). To ensure access to this please contact Student Affairs, to engage in a confidential conversation about the process for requesting reasonable accommodations in the classroom setting. Students are encouraged to register with the Office of Student Affairs as soon as they begin their program. Accommodations are not provided

retroactively. Rutgers School of Graduate Studies encourages students to access all resources available through the School for consistent support and access to their program.

More information can be found online at

http://njms.rutgers.edu/education/student_affairs/student_support/disability_services.cfm .

Rutgers University welcomes students with disabilities into all of the University's educational programs. In order to receive consideration for reasonable accommodations, a student with a disability must complete the ODS registration form: https://webapps.rutgers.edu/student-ods/forms/registration and contact the RBHS Office of Disability Services at 973-972-5396 or cindy.poorepariseau@rutgers.edu to make an appointment for an intake interview. You will also be asked to provide documentation of your disability:

https://ods.rutgers.edu/students/documentation-guidelines .

If the documentation supports your request for reasonable accommodations, the Office of Disability Services will provide you with a Letter of Accommodations. This Letter will be used to notify appropriate school personnel about the accommodations you are qualified to receive. To begin this process, please complete the Registration form on the ODS web site at: https://webapps.rutgers.edu/student-ods/forms/registration .

TEACHER-LEARNER POLICY AT RUTGERS SCHOOL OF GRADUATE STUDIES:

The Rutgers SGS Newark Health Science Campus strongly believes that teaching and learning should take place in a climate of mutual respect where students and faculty are equally responsible for maintaining a professional and collegial environment. An environment where students are evaluated based upon accomplishment, professionalism and academic performance. We are committed to maintaining a positive learning environment and the highest standards of behavior in the teacher-student relationship.

To view the full Teacher-Learner policy for the School of Graduate studies, please follow this link: https://njms.rutgers.edu/sgs/current_students/docs/Teacher%20Learner%20Policy.pdf

BASIC HISTOLOGY – CBMM N5001
Fall 2025

Course Schedule

Week	Date	Topic	Netter's Histology Chapters	Junqueira's Histology Chapters
1	8/21/2025	Introduction, Cells	1, 2	1-4, Appendix
		Epithelium		
2	8/28/2025	Connective Tissue	3	5, 6
		Blood and Bone Marrow	7	12, 13
3	9/4/2025	Muscle	4	10
		Nerve	5	9
4	9/11/2025	Skin (Integumentary System)	11	18
		Cartilage and Bone	6	7, 8
5	9/18/2025	Eye and Ear (TBL Quiz)	19-20	23
6	9/25/2025	Cardiovascular System	8	11
		Exam Review	Review of MC questions and Virtual Microscope quizzes	
7	10/2/2025	**Mid-Term Exam**		
8	10/9/2025	Lymphoid System	9	11, 14
9	10/16/2025	Digestive System (Part 1)	12-14	15, 16
10	10/23/2025	Digestive System (Part 2)	12-14	15, 16
11	10/30/2025	Endocrine System	10	20
12	11/6/2025	Urinary System	15	17
13	11/13/2025	Reproductive System (TBL Quiz)	17, 18	21, 22
14	11/20/2025	Respiratory System	16	19
		Exam Review	Review of MC questions and Virtual Microscope quizzes	
15	12/4/2025	**Final Exam**		