Syllabus

Course Title: Radiological Anatomy

Course No.: MP6300

Course director/ Instructor: Sunil Dutta, MD

Email: sunil.william.dutta@emory.edu

Other instructors: Guest lecturers from Emory Radiation Oncology department

Text: E-Anatomy (https://www.imaios.com/en/e-AnatomyLinks to an external site.) (recommended but not required)

Credits:

Hours of Instruction: 1 hour per week

Semester(s) Offered: Fall

Suggested References:

All material required for this course will be provided during the lectures in the form of slide decks. Other optional references are listed below:

Peter Fleckenstein and Jorgen Tranum-Jensen. Anatomy in Diagnostic Imaging, 2nd ed. Blackwell Publishers (2001). ISBN: 8716123360

Jamie Weir and Peter H. Abrams. Imaging Atlas of Human Anatomy, 3rd Mosby (2003). ISBN: 0-7234-3211-2 ($46.97 new).

Paul Butler, Adam W. M. Mitchell, and Harold Ellis (eds). Applied Radiological Anatomy. Cambridge University Press (1999). ISBN: 0521481104

Frank H. Netter. Atlas of Human Anatomy, 4th ed. Saunders (2006). ISBN: 1416033858

Evaluation Scheme: There will be three exams. All three will count equally towards the final grade. Class participation will count for up to 5% of the total grade.

Course Outline:

Expands on foundational anatomy & physiology knowledge, focusing on clinically relevant human anatomy visualized through diagnostic imaging.

Covers common pathologic conditions (benign and malignant) identifiable via imaging.

Emphasizes anatomy interpretation using CT, MRI, PET, and radiographs, with ultrasound and angiography where applicable.

Highlights advantages, limitations, and artifacts associated with imaging modalities.

Utilizes recommended textbooks, clinical cases, and real-world imaging examples.

Introduces anatomical considerations relevant to medical physics applications, including dosimetry and radiation safety.

Course Policies

Attendance and/or Participation

Attendance is expected for this course.

Academic Integrity

Georgia Tech aims to cultivate a community based on trust, academic integrity, and honor. Students are expected to act according to the highest ethical standards. Review Georgia Tech's Honor Code and the student Code of Conduct.

Any student suspected of cheating or plagiarism on a quiz, exam, or assignment will be reported to the Office of Student Integrity, who will investigate the incident and identify the appropriate penalty for violations.

Core IMPACTS

Core IMPACTS is the University System of Georgia's General Education curriculum. If you are teaching a course that counts towards Core IMPACTS, you should include a syllabus statement about the Core area and associated career competencies. This resource developed by the Center for Excellence in Teaching and Learning and Online Education at Georgia State University includes template syllabus statements for each of the Core IMPACTS areas that you may adapt for your course.

Accommodations for Students with Disabilities

If you are a student with learning needs that require special accommodation, contact the Office of Disability Services (404-894-2563) as soon as possible to make an appointment to discuss your special needs and to obtain an accommodations letter. Please also e-mail me as soon as possible in order to set up a time to discuss your learning needs.

Student-Faculty Expectations Agreement

At Georgia Tech, we believe that it is important to strive for an atmosphere of mutual respect, acknowledgement, and responsibility between faculty members and the student body. The Student-Faculty Expectations articulate some basic expectations that you can have of me and that I have of you. In the end, simple respect for knowledge, hard work, and cordial interactions will help build the environment we seek. Therefore, I encourage you to remain committed to the ideals of Georgia Tech while in this class.]

Pre- &/or Co-Requisites

Students should have taken or be taking undergraduate level Anatomy and Physiology. This course may be taken at any accredited university and must be taken for a grade.

Extra Credit Opportunities

No extra credit opportunities.

Collaboration, Group Work, and Use of Generative AI

Assignments should be completed individually. No Ai use.

Extensions, Late Assignments, & Re-Scheduled/Missed Exams

No late assignments will be accepted. If there is an outstanding circumstance, students should work through the Office of the Dean of Students for accommodations.

Inclement Weather and Digital Learning Days

Classes will move to on-line delivery with recording for these days.,

Campus Resources for Students

Graduate Student Academic and Professional Success Resources:

A list of resources for graduate students is given on the Office of Graduate and Postdoctoral Education website. Specific information for current graduate students includes

Academic Resources such as the Communications Center, Language Institute, Library, Catalog, Registrar, resources for conducting research, Advocacy and Conflict Resolution resources, and how to manage unexpected situations that may impact your academic performance;

Student Resources such as Campus Services, Child Care/Family programs, Health & Wellness, Career Services, and the Student Resource Guide; and

Professional Development such as the programming from the Career Center and other professional development resources and events"

Student Well-Being:

At Georgia Tech, we are concerned about your overall physical, social, and mental well-being. A comprehensive list of wellness related resources has been compiled and maintained by the Office of the Vice President for Student Engagement and Well-being (student-resource-guide (gatech.edu)

Course Schedule:

August 31: Introduction to Radiological Anatomy and Imaging Modalities

Anatomical terminology, planes, and spatial orientation across imaging modalities

How X-ray, CT, MRI, PET, and ultrasound depict normal anatomy

September 7: Radiological Anatomy of the Musculoskeletal System

Bone, joint, and soft tissue anatomy on radiographs, CT, and MRI

Key anatomical landmarks used for interpretation and localization

September 14: Radiological Anatomy of the Spine

Vertebral levels, spinal canal, cord, and nerve root anatomy

Cross-sectional anatomy on CT/MRI for level identification

September 21: Thoracic Radiological Anatomy

Lung segments, mediastinum, heart, and great vessels on CT

Spatial relationships critical for interpreting thoracic imaging

September 28: Abdominal Radiological Anatomy

Solid organs, bowel, and retroperitoneal structures on CT/MRI

Key anatomical boundaries and compartments

October 5: Exam 1 (Material from August 31 – September 28)

October 12: Fall Break – No Class

October 19: Radiological Anatomy of the Pelvis

Pelvic organs, musculature, and bony landmarks on CT/MRI

Spatial relationships of GU, GI, and reproductive structures

October 26: Head and Neck Radiological Anatomy

Skull base, airway, glands, and fascial planes

Lymph node levels and key cross-sectional landmarks

November 2: Central Nervous System (CNS) Radiological Anatomy

Brain regions, ventricles, and deep structures on CT/MRI

Anatomical organization relevant to cross-sectional imaging

November 9: Vascular and Lymphatic Anatomy in Imaging

Major arterial, venous, and lymphatic pathways on imaging

Nodal stations and drainage patterns

November 16: Radiological Anatomy for Computational Models

Standardized anatomical atlases and segmentation frameworks

Representation of anatomy in digital phantoms

November 23: Exam 2 (Material from October 19 – November 16)

November 30: Quantitative and Functional Anatomy

Anatomical regions used for standardized measurements (e.g., PET uptake regions)

Structure-function relationships in imaging

December 7: Emerging Anatomical Imaging Techniques

How newer modalities (e.g., PET/MR) refine anatomical visualization

Impact of reconstruction on anatomical accuracy

December 14: Course Review and Clinical Applications

Integrated review of cross-sectional anatomy across regions

Application of anatomical knowledge to clinical imaging cases

December 21: Final Exam (All course content)