I. Course Coordinator

Gerald R. Aben, MD FACR
Associate Professor
Department of Radiology
846 Service Road
185 Radiology Building
Phone: 884-3265
E-mail: gerald.aben@radiology.msu.edu
Office Hours: By appointment
(For appointments please email Dr. Aben (Gerald.aben@radiology.msu.edu)

II. Participating Faculty

Gerald R. Aben, MD

III. Course Design:

RAD 553 is designed as an introduction to radiological imaging of normal and abnormal human anatomy. We will stress the anatomical and physiological basis of the radiological image. These radiological studies include images obtained by the use of x-rays in their various modes of application, ultrasound, nuclear medicine, and magnetic resonance.

The thrust of this course is to create an understanding of the close relationship between the normal structure in the patient and mechanisms of disease responsible for deviations from it. Imaging in its many contemporary variations is outstanding in its representation of the disease process. This course will assist the student in learning some of the basic principles of imaging pathology. It will provide an introduction to the application of imaging to the evaluation of the patient.

A few of the more common indications and dilemmas of application of these imaging procedures will be discussed, again stressing the basic issues rather than detailed diagnosis.

Detailed application of diagnostic imaging studies will be undertaken later in other courses.

IV. Course Content:

A blended course that includes online lectures, supplemental materials and live case discussion sessions.

V. Specific Objectives: After completing this course, the student should be able to:
A. Have an overall knowledge of the imaging modalities in terms of their physical basis and general principles of interaction with body structures.

B. Understand technical principles regarding how an image (x-ray, ultrasound, nuclear medicine, computed tomography, magnetic resonance, PET, etc.) is obtained.

C. Recognize the appearance of basic abnormalities on various imaging studies with a general understanding of how the pathology is responsible for the appearance.

D. Be fluent in basic descriptive terminology used in the various imaging techniques.

E. Recognize normal anatomy and some common normal variants.

F. Understand the general principles and the utility of interventional radiology (diagnostic and therapeutic).

G. Determine when an imaging study would be helpful as an aid in diagnosis.

H. Have an understanding of the demonstrability of developmental anomalies and preferred methods of showing these in utero, and in childhood.

I. Be aware of the biological changes that can be caused by ionizing radiation.

J. Develop an understanding of the relative risks related to the different imaging modalities.

VI. Learning Resources:

A. The blended curriculum as outlined in the class schedule represents the mainstay of the course.

B. Online materials as listed in D2L.

C. Textbook for RAD 553 (Recommended)

Harvard University Press, 2004

This is a basic textbook for students; it approaches diagnostic radiology in a straightforward, simple and practical manner. This textbook will be a valuable resource for the student throughout medical school and is used as a radiology reference in other courses.

D. All course materials are also available online including recordings of all lectures with transcription at: http://www.rad.msu.edu/Course/Rad553/ in addition to the Course D2L site.

VII. Course Evaluation and Management:

A. We attempt to provide the best possible circumstances for presentation of the material. However, technical circumstances, funds and other limitations often detract from the ideal.
B. If special problems arise, we recommend that you contact the people involved in the management of this course: your respective college office or call the course coordinator, Dr. Aben, at 517-884-3265, or email at gerald.aben@radiology.msu.edu.

C. Letters of commendation for outstanding performance will not be given for this course due to the basic introductory content level and the one credit course assessment.

VIII. Student Evaluation:

A. A waiver examination will not be offered for this course.

B. Quizzes will be associated with each of the modules of the course. Each module includes a series of online presentations. Each quiz will be worth 5% of the student’s grade. Quizzes will be accessed via D2L. Collaboration is not allowed. The student will be allowed 20 minutes to complete the quiz.

C. Midterm and final examinations will be given. Examinations will be computer-based and will be delivered via ExamSoft using college-provided computers in college testing facilities. Both examinations will consist of multiple choice and matching questions, some of which will be associated with radiological images, others based on understanding of course material.

D. The quizzes will represent 20% of the grade. The midterm will represent 40% of the student's total score with the final exam contributing the remaining 40%. The final exam may be cumulative; however the final portion of the course will be stressed.

E. Passing the course (P grade) requires a combined score of 75% or above on the quizzes, midterm and final. Students scoring below 75% will receive an N grade and can remediate by passing a comprehensive remediation examination scheduled for July 1, 2015. Students failing the remediation examination must re-enroll for the course at its next offering.

IX. Exam Administration Policies

Michigan State University has established policies on the integrity of scholarship and grades (“All University Policy on Integrity of Scholarship and Grades”). CHM follows these policies as well as those prescribed in the document on “Medical Students’ Rights and Responsibilities”. The faculty has the responsibility to insure the integrity of scholarship and grades. In order to facilitate the performance of this responsibility, the following specific policies are followed for exams in RAD553.

1. Students will be admitted to the examination starting 20 minutes before the exam begins. Exam entry doors will be closed 5 minutes prior to the posted start time of the exam. This is to allow administrative time to communicate examination instructions and for logging in and downloading exams. A student may not leave the exam room once checked in, except for the circumstances described below (food or restroom breaks).

2. Arrival time will be defined by cell phones rather than watches or wall clocks. If a student who is thought to arrive late can demonstrate to the proctor that his/her personal cell phone demonstrates an on-time arrival, s/he will be admitted to the examination. If the student did not
bring a cell phone to the examination, the time will be defined as the time that appears on the chief proctor’s cell phone. **Late arrivals will not be admitted to examinations. In cases of disputes, the faculty proctor will be contacted.**

3. Late students should follow the procedure for requesting an excused absence by submitting the “Request for Approval of Absence from Examination or Required Experience” form, which can be found on D2L and in the CHM Preclinical Student Handbook. Attach the completed form to an e-mail sent to the appropriate e-mail address: East Lansing students - absencEL@msu.edu; Grand Rapids students – absencGR@msu.edu. The request will be reviewed by the Asst. Dean and/or Director of Preclinical Curriculum. If an excused absence is granted, the student will be contacted by the curriculum assistant at his or her campus to notify him or her of the date, time, and location of the makeup examination.

4. Upon entering the examination room, proctors will require students to present picture identification (e.g., student ID, driver’s license).

5. Exams will be proctored according to a proctor/test taker ratio of 1/25 with at least one faculty member and at minimum one proctor of each gender. This proctoring arrangement is a close approximation of the proctoring arrangement followed by the USMLE during the Step 1 (board) exams.

6. Upon entering, deposit all watches, books, notebooks, backpacks, outerwear (defined as any item which can be unzipped, unbuttoned, or otherwise removed without pulling over the head, provided that removal of the item does not compromise the modesty of the wearer), head wear (including hooded pullover sweatshirts), and electronic devices of any kind in the designated area as directed by proctors. **Cell phones MUST be in the off mode and must be placed with other personal belongings in the designated area.** You will not be allowed to access personal belongings during the exam. Any food or drink must be deposited on a table outside the exam room prior to the examination. Students may take food or beverage “breaks” during the exam, which will be “counted” as part of the exam administration time.

7. Students will be assigned a computer station or a numbered desk prior to the examination. Once at the assigned station the computer may not be used for any purpose other than taking the exam.

8. Log-in codes are supplied to students prior to the examination. Proctors do not have access to login information. Students who are unable to remember their login code will be excused from the testing center by a proctor. The student should then:
   a. follow the “forgot password” procedure with ExamSoft
   b. submit the form entitled **“Request for Approval of Absence from Examination or Required Experience”** and
   c. contact the course assistant, who will arrange for a make-up examination.

9. Students will not be able to begin the examination until given an access code. The proctor will begin the examination by reading the instructions, followed by the access code.

10. Each student will be given a dry erase board and dry erase marker, upon which notes can be made once the exam starts. If additional space is needed for making notes, the student should raise her/his hand, and a proctor will collect the filled board and replace it with a clean one. **Do not erase the boards.**

11. The ExamSoft program presents a 2 minute warning “window” prior to the end of the exam time. The ExamSoft program allows the student to set an additional alarm if preferred. If a student finishes the exam with less than 10 minutes in official time remaining s/he will be required to remain at the assigned exam station. The computer may not be used for any reason during this time.

12. The ExamSoft web site has a section of Frequently Asked Questions that should be reviewed by all students.

13. Students who want to take a break for food or drink must raise his/her hand and be accompanied by a proctor. Only one student may leave the examination room at a time.
14. Students who need a restroom break will be accompanied into the restroom by a proctor of the same gender.
15. If at any time during the exam you feel physically unable (e.g. extremely nauseous, dizzy, or otherwise acutely ill) to continue the exam, please raise your hand to summon a faculty proctor. The faculty proctor will recommend that you leave the exam. If you choose to leave, you must submit the “Request for Approval of Absence from Examination or Required Experience” form as described above for late arrival to an exam.
16. Students must refrain from distracting behavior such as toe tapping, finger drumming, thinking out-loud, etc. Students engaged in such activity will be instructed to discontinue it and if the behavior continues, to discontinue their exam and exit the room.
17. Suspicious behaviors such as looking around the room or at others’ computers must be avoided. Exam proctors have the responsibility to address such behaviors during examinations. If this occurs, a faculty proctor will be called to intervene and will address the problem with the student, document it, and contact the Assistant Dean/Director of Preclinical Curriculum, whereupon an investigation of the facts will be conducted and a meeting with the student arranged. If the behavior cannot be explained to the satisfaction of the course director and the administrator, a penalty grade for the course will be assigned by the course director.

Post Exam Review and Challenges

- Students will be able to review initial scoring at noon on the exam day by logging into the ExamSoft website. Individual responses may obtained through the ExamSoft website.
- There will be no formal exam reviews in this course. If a student wishes to challenge an exam item, the student must contact the course director or local site faculty as appropriate to arrange a meeting to look at the exam item and discuss the challenge. The student may also request to review the exam with a curriculum assistant and may submit a written challenge to a question using a form provided. The challenge will be sent to the course director by the curriculum assistant. The course director will review and discuss all challenges and respond as appropriate. All challenges must be submitted within one week of the original exam.

Excused absence policy

Make-up exams are provided only to students who have missed the scheduled exam and have an excused absence. For all exam absences, whether or not a student believes the reasons to be compelling, a “Request for Approval of Absence from Examination or Required Experience” form must be completed and submitted to the appropriate e-mail address: East Lansing students - absencEL@msu.edu; Grand Rapids students – absencGR@msu.edu. The request will be reviewed by the Asst. Dean and/or Director of Preclinical Curriculum. If the student is granted an excused absence from an exam, he/she will be contacted by Patti Wilkins (Patti.Wilkins@hc.msu.edu) or Candi Obetts (Candace.Obetts@hc.msu.edu) to notify him/her of the date, time, and place of the make-up exam, which will be scheduled within three days of the original exam.

If a student does not receive an excused absence for the exam and/or does not make up the missed exam, the student will receive a score of “0” for the missed exam, which will be used in the computation of the Overall Course Score.

X. How to Learn

At your level in the continuum of medical education, I believe that you should really
stress the manner in which the anatomy and the physiology of the patient are changed by the disease process and how these changes can be identified by diagnostic imaging studies. Over the last few years, laboratory, chemical and diagnostic imaging methods have been gradually, but very significantly, increasing in their importance in diagnostic decision making.

However, it is difficult to understand without having some base of facts. Therefore, I recommend:

A. Read the appropriate textbook pages/section prior to each lecture or module. Many of the references are to the images and captions on the pages. Remember that almost ½ of the radiology text is composed of images.

B. Develop a habit of looking through the material after each module and before the next one to maintain yourself at a continued level of knowledge and understanding. Since I do not stress simple factual knowledge (although some is unavoidably needed), it is going to be difficult to learn it all in the last few days before each examination. Do not depend on the coursepack and audio recordings to learn in this course. The dynamic imaging range available in the on-line modules as well as the use of layered imaging makes this an unreliable method to learn radiology.

C. To perform such a review, go over the online material that I provide to you. Make sure that you have some understanding of each of the items listed. If there are obvious gaps, review your notes or the books available to you. Take advantage of the multimedia methods of presentation of the course material to strengthen your understanding of each module.

D. Depending upon your personal inclination, utilize the web or other resources for additional learning. The web series is fairly self-explanatory. Here are some suggestions on using the textbook:

1. First, read through the chapter or section you are working on.
2. Then, look at the pictures in the book and try to make up your mind as to what the abnormality is and what its significance may be without reading the legend.
3. Then read the legend associated with that picture. This will give you a few additional clues.
4. After that, if you're still not clear about the issue, read the appropriate sections in the text chapters of the book again, or consult some of the reference material.

E. Try to look at any of the illustrations in any of the textbooks available to you, the web series or any other radiographic examinations you may have at hand without first getting hints as to what the abnormality may be. You will find this quite difficult at first, but as time goes on you will develop a feel for what is grossly normal and what is grossly abnormal and in what general direction the abnormalities point.

F. Ask yourself: What kind of disease process would cause these imaging changes? What kind of imaging study would best demonstrate a certain pathophysiological process or deviation from normal?
G. One last general comment: This most likely is one of your first steps into the clinical component of learning medicine. The world of disease is infinitely large and it is impossible to know everything even though there is a great desire to know as much as possible.

I cannot "cover" everything nor can you learn everything. You will have to concentrate on learning those things which appear to be most important, most common, and maybe those with which you seem to have the most difficulty. There will be insecurity about what to know and what not to know, but that is part of medicine. You will face the same insecurity when dealing with the patient.

Good luck and smooth sailing through this course!

XI. **Course announcements** will be posted to the MSU D2L system and email will also be used to provide course information and updates. Please check D2L regularly for material. Links to the recorded broadcasts of the lectures will be made available on the D2L system as well as on the course website.

XII. **Course and Faculty evaluations** will be done via the Web [http://kc-server.com.msu.edu/Blackbelt/MED_Evaluation/Index.html](http://kc-server.com.msu.edu/Blackbelt/MED_Evaluation/Index.html) Please complete these by Monday, July 6 at 11:59 p.m. -- your feedback is very important in shaping this course into the future. Many of the improvements made each year are based on student comments.