

Members present: Jayakrishna Ambati, Hubert Ballard, Jennifer Brueckner, Charles Griffith, Davy Jones, Catherine Martin (Chair), Martha Peterson

Members absent: Thomas Curry, Greg Davis, Thomas Getchell, William Maragos, Nancy Schoenberg

Guests: Dean Jay Perman, Emery Wilson, MD and Darryl Jennings, MD

- I. Review By-Laws regarding communication between Curriculum Committee and Dean
 - a. Guests: Emery Wilson, MD and Darryl Jennings, MD (See Attachment A: Separate Document)
 - b. The guests described their anticipation that upcoming LCME review group will demandsome clarifications in how the Dean and Faculty relate to the Curriculum in the College of Medicine. The following anticipated concerns (in red font below, from the COM Faculty Rules) were core. Concerns will require clarification of the lines of communication and responsibility.

4. review proposals for changes in content, emphasis and approximate time allotment for each course offered. To facilitate this activity, each Department Chair, in consultation with their Course Directors shall submit as part of the curriculum quality assurance program an annual written report to the Curriculum Committee in which the educational operating procedures for each of the department's courses are reviewed and in which changes are proposed. Based upon a review of the collective reports, the Committee will produce an annual quality assurance report and recommend curriculum changes to the Faculty Council who will study the recommendation(s) and assess strengths and weaknesses. If the Council approves the recommendations as submitted, the Council will notify the Dean and request that the curriculum changes be implemented. The Faculty Council's ex-officio representative to the Curriculum Committee has the discretion to approve on behalf of the Faculty Council course changes or submission he/she deems to be minor changes. The ex-officio member should refer major changes to the entire Faculty Council for discussion and approval. Routine matters related to course administration will be coordinated by the Office of Academic Affairs by interaction with appropriate Course Directors. When a recommendation is not approved, the Council will notify the Curriculum Committee of the basis for the decision and may make suggestions for strengthening the Curriculum Committee's recommendation.

- II. Required Syllabus Requirements for Clerkships
 - a. Dr. Darrell Jennings (See Attachment B): Dr. Jennings represented the proposed requirements for 3rd and 4th year clerkship syllabi. This has evolved after careful thought from the University, LCME guidelines and concerns that there was limited uniformity between courses.

- III. Review College Rules documentation concerning the Appointment, Appeal, Promotion and Tenure Committee. Dean Perman invited the Faculty Council to initiate an examination of the policies about the committee, including the method used to select the members; either by (1) direct election from the faculty or (2) dean appoints the committee after consulting with the faculty (or appropriate faculty group) (See Attachment C)
- IV. Discuss the Chair Elect
 - a. Dr. Martha Peterson was nominated, elected, and has graciously agreed to assume the Chair of Faculty Council in the Fall.
- V. Course Review: Introduction to Magnetic Resonance Imaging (Ana 655) (See Attachment D)
 - a. Faculty Council approved with request for clarification of how this overlaps with Dr. Jane Joseph's course. From Dr. Joseph *"They actually overlap very little. The course I teach is more applied and specifically focuses on fMRI, it looks like only 2 lectures in ANA655 overlap with the content of my course. Conversely, much of the principals of MRI are only about 1-2 lectures in my course. In addition, students who would likely take ANA655 are engineers and students who likely take my course are psychology / behavioral science. it would be nice of the same cohorts took both courses, but at least historically that has not been the case."*
- VI. Summary of Council of Chairs (See Attachment E: Stimulus Package)
 - a. Update on Radiology was reviewed. Please see attachment for stimulus package information.
- VII. Faculty Exit Surveys
 - a. The Dean is supportive of Dr. Nash performing all exit interviews. Dr. Nash feels this is an important function and will be developing ideas on how to proceed.
 - b. Questionnaire: There is a Survey Monkey compatible survey. Dr. Martin will be looking at models for questionnaires. We will invite Dr. Stratton to talk to us about the current data base.

Attachment A: LCME (Separate Document)

Attachment B: REQUIRED SYLLABUS COMPONENTS FOR CLERKSHIPS

Attachment C. Governing Regulations

Attachment D. fMRI Course

Attachment E: Council of Chairs: Stimulus Package (Separate Document)

Attachment B. REQUIRED SYLLABUS COMPONENTS FOR CLERKSHIPS

Each clerkship syllabus should contain the following required components:

- Institutional Objectives

- Course Objectives linked to Institutional Objectives

- Course Description

- Course Requirements (activities required for students during the clerkship)

- Information on the types of patients and clinical conditions that students must encounter

- Student Schedule and Assignments

- Clinical Sites for the course (inpatient, outpatient)

- Evaluation Policy and Practices (attendance, grading, examinations, formative and summative feedback information)

- Professionalism and Plagiarism Policy

Attachment C. Governing Regulations

I. Policy Hierarchy: Board of Trustees – Governing Regulations

Administrative Management Policies

- President: Administrative Regulations
- Provost: Policy memoranda
- Dean: College policy memoranda
- ↓ Chair: Dept. policy memoranda

Academic Educational Policies

- University Senate: Rules of University Senate
(no entity corresponding to Provost level)
- College Faculty: Rules of the College Faculty
- ↓ Dept. Faculty: Rules of Dept. Faculty

II. Governing Regulations/Administrative Regulations

Responsibilities of College Faculty:

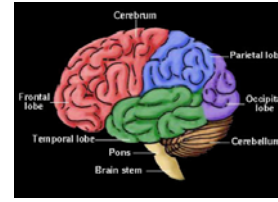
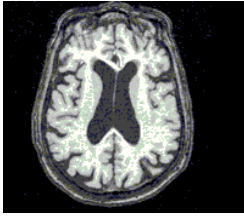
- “**the faculty** of a college shall **determine** the educational policies of that college,”
 - “academic requirements, curricula, course offerings, undergraduate, professional programs,
 - “graduate and research programs,
 - “service functions,
- “to the extent that the responsibility has not been **delegated to a ... dept.**”
- “**The faculty** of a college **may delegate** by rule a defined part of the determination of its educational policies **to a [faculty] assembly** of the college”
(i.e., College Faculty is not authorized to delegate its determination of college educational policies to any entity except a body of faculty)
- elect the college advisory committee to the dean on (re)appt/promotion/tenure or choose that dean appoints, but dean *by College Faculty Rule* must first consult faculty body. (Policy must be identified in College Rules)
- advise the dean on dean’s administrative procedures for
 - faculty (re)appointment/promotion/tenure
 - faculty performance review
 - evaluation of chair performance between periodic reviews of chair/dept.
- The faculty of each college **shall establish its own rules**, including a committee or council structure, necessary for the performance of the faculty's functions in educational policy-making. (Approved by Provost “for consistency” with higher regulations)

Responsibilities of Dean: “**enforcement** of the[] Governing Regulations, the Administrative Regulations, University Senate Rules... **overseeing** the educational work of the college and its **conduct and management** in all matters not specifically charged elsewhere. The dean is responsible for the **implementation** of the curricula of the college ... establish and enforce such **policies and procedures** as are attendant to the **administrative management** of the operations of the college.”
(I.e., the managerial policies of the Dean are distinct from the Rules and policies of the Faculty)

III. Compliance of COM Faculty Rules document with higher regulations and Senate Rules

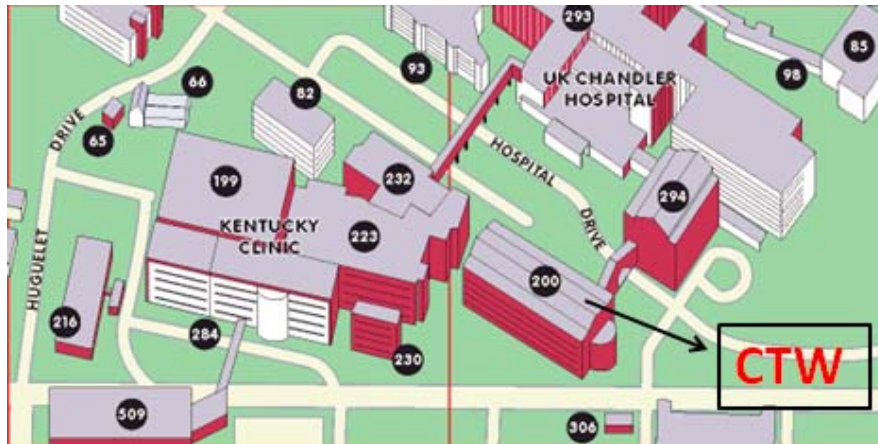
- Asso. Provost has developed checklist of items expected to be in College Faculty Rules
- Asso. Provost has identified areas of COM Faculty Rules needing updating
- Asso. Provost has alerted as to GR policy (effective 2005): the only policies on criterial “evidences” allowed for use in promotion/tenure are (1) University ARs and (2) written policy of a dept. faculty (& approved by dean). (I.e., prior college-level policies no longer in force to any dept., unless expressly adopted by a given dept. faculty for that dept.)

Attachment D.



MRI Course:

ANA 655 Introduction to Magnetic Resonance Imaging



Fall, 2009

Course Description: Introduces magnetic resonance (MR) imaging from the basic concepts to recent cutting-edge applications. Basic physics and chemistry of magnetic resonance; acquiring images using a scanner; fundamentals of image formation; processing MR images; interpreting images in terms of anatomy and physiology; MR spectroscopy; tracking neuronal fibers; functional MR imaging; cardiac and neurologic imaging. Students completing the course will have a basic knowledge of MR imaging fundamentals and applications.

Details: 30 - 1.5 hour meetings, 2 per week, 3 demonstration labs, 3 credits; Meets Tuesday/Thursday a.m. 9:00 – 10:15 starting August 27, 2009. Open to Graduate Students. Location: CTW 218 (building 200 in map above). Course Number: ANA 655

Contact: Dr. Charles Smith; csmith@mri.uky.edu, 323-1113.

Web Site: <http://www.mc.uky.edu/mrisc>

Fall 2009

**Introduction to Magnetic Resonance Imaging
(Ana 655)**

Faculty:

Course Director: Charles D. Smith, MD, Director, MRISC; Room 62, MRISC;
csmith@mri.uky.edu; (CDS)

Lecturers:

Anders Andersen, PhD, Associate Professor, Department of Anatomy & Neurobiology;
anders@mri.uky.edu; (AHA)

Peter Hardy, PhD, Assistant Professor, Biomedical Engineering; peter.hardy@uky.edu;
(PAH)

David Powell, PhD, Adjunct Professor, Biomedical Engineering;
dkpowe00@mri.uky.edu;
(DKP)

Faculty Contact: To schedule faculty appointments, contact Nancy Baily, MRISC, 323-3973;
bailey2@mri.uky.edu

Time and Place:

Tuesday, Thursday

Time: 9:00am – 10:30am

Place Charles T. Wethington, Jr. Building (CTW) 218

Prerequisites: Open to UK graduate students. An undergraduate major in a science discipline is required. Please contact the course director for exceptions.

A. Course Description (3 credits):

Introduces magnetic resonance (MR) imaging from the basic concepts to recent cutting-edge applications. Basic physics and chemistry of magnetic resonance; acquiring images using a scanner; fundamentals of image formation; processing MR images; interpreting images in terms of anatomy and physiology; MR spectroscopy; tracking neuronal fibers; functional MR imaging; cardiac and neurologic imaging. Students completing the course will have a basic knowledge of MR imaging fundamentals and applications to brain function, brain injury, disease, normal aging, etc.

Demonstrations: Three in-class demonstrations of MRI technology will be given to provide a real-life experience for the students. Demonstrations will take place in the Magnetic Resonance Imaging and Spectroscopy Center (MRISC) in the Whitney Hendrickson building, and the acquired images will be used in subsequent lectures.

Objectives: The objective of the course is to provide a solid foundation in magnetic resonance imaging for more advanced reading and for research work in the field.

B. Reading Material:

Text Book: MRI Principles, *Second Edition*, D.G. Mitchell & M.S. Cohen, Saunders 2004.

Further material may be provided by individual instructors and will consist of recent reviews and journal articles. Web resources: <http://www.cis.rit.edu/htbooks/mri/>

C. Grading:

Examination and quiz grading will be on a percentile curve if the class distribution is below the expected normal, otherwise on an absolute percent scale. Presentations/reports will be rated on a 0 to 100 scale by the faculty.

Midterm exam 25%

The mid-term exam will be a series of best-choice multiple choice questions covering basic concepts, vocabulary and specific information delivered in the lectures and demonstrations in the first half of the course. The information needed to answer the questions will be covered in the lectures.

Final exam 25%

The final exam will be a series of best-choice multiple choice questions covering basic concepts, vocabulary and specific information delivered in the lectures and demonstrations over the whole course, but will emphasize new information from the second-half lectures and demonstrations. Reading the book or looking at the on-line slide sets alone may not provide enough information to get an "A" in the course, because lectures may cover areas not in these sources.

Weekly quizzes 25%

Weekly quizzes will be taken on line to cover the most important basic concepts and vocabulary related to that week's material.

Presentation/report 25%

A list of options will be provided for presentations or reports. Students are expected to choose one option for credit. Topics will include recent developments in MRI and research relevant to work being done at UK. Students will be given 15 minutes to present a PowerPoint report with 5 minutes allocated for discussion. Each student will be assigned to one of the instructors to provide guidance for their chosen topic.

Scoring for exams, quizzes, and presentations:

| <u>Scores</u> | <u>Grade</u> | <u>Basis</u> |
|---------------|--------------|--|
| 90-100 | A | Answer fulfills most of what the instructor is looking for (additional points may be given for outstanding answers). |
| 80-90 | B | Answer correct in many respects, but could have been better. |
| 70-80 | C | Answers are flawed to some degree. |
| 60-70 | D | Answers are significantly flawed. |
| 0-60 | E | Did not turn in a serious effort. |

D. Students Auditing:

Active participation in the course is essential for all students to achieve the course objectives. It is expected that every student, regardless of whether or not the course is taken for credit or a grade will actively participate in the course and discussions.

E. Attendance and Excused Absences:

Acceptable reasons for excused absences are listed in the Students Rights and Responsibilities. Students are entitled to an excused absence for the purpose of observing their major religious holidays. In the cases of excused absences, students will be given the opportunity to make up missed work or exams. However, the student must notify the course director prior to missed work or exams. Attendance at the three demonstrations is mandatory for

the course; a penalty of 1 grade point will be assessed for each (unexcused) demonstration missed.

Attendance at all lectures is mandatory and will be recorded. A penalty of one half grade point will be assessed for each unexcused lecture missed.

F. Office Hours:

To schedule faculty appointments, contact faculty directly.

G. Course Outline:

Thurs 8/27/09 Course Introduction (CDS) - Details about course structure, expectations, grading, etc.

- a. MRI and other medical imaging technologies
- b. Role of medical imaging in health care
- c. Survey of applications of MR in biological research

Tues 9/1/09 Nuclear Magnetic Resonance Phenomena (CDS)

- a. The nuclear magnetic field
- b. Resonance concept
- c. Magnetic interaction, precession & the Lamor equation
- d. Magnitude and phase
- e. Basic spin interaction & resonance
- f. Bulk magnetization & Boltzmann distribution

Thurs 9/3/09 Relaxation (DKP)

- a. Local chemical / magnetic environment
- b. Spin-spin interaction & T2
- c. Lattice interaction & T1

Tues 9/8/09 Bloch equations and basic spectroscopy (DKP)

Thurs 9/10/09 Spatial Encoding (AHA)

- a. Gradient vs. static field
- b. Frequency encoding
- c. Phase encoding
- d. Slice selection

Tues 9/15/09 Basic Sequences (AHA)

- a. Basic spin echo pulse sequence.
- b. Pulse sequence diagram
- c. PD, T1, T2 sequence & examples

Thurs 9/17/09 Signal, Noise, Contrast and pulse sequence considerations, 2D and 3D (AHA)

- a. Signal strength equations.
- b. Sources of noise
- c. Intro to k-space and segmented acquisitions
- d. Echo planar acquisition

Tues 9/22/09 **Imaging Demonstration I.**

- a. tour of Trio MR Imager; identify parts
- b. imaging brain of volunteer with 2D, T1, PD, T2, three planes + oblique, 3D

c. safety considerations

Thurs 9/24/09 Neuroimaging Cases I (CDS)

- a. T1 – cortical anomalies & malformations, hydrocephalus
- b. Contrast enhanced tumors
- c. T2 – Strokes, tumors, MS
- d. FLAIR - Multiple sclerosis
- e. Diffusion – tumor, stroke

Tues 9/29/09 Other Sources of Contrast & its Manipulation (PAH)

- a. Optimization of signal / contrast
- b. Magnetization transfer
- c. Contrast agents for image enhancement

Thurs 10/1/09 Cardiac imaging (Guest lecturer)

Tues 10/6/09 Flow effects (PAH)

- a. Motion of spins
- b. Flow compensation & encoding
- c. Flow artifacts
- d. MR angiography

Thurs 10/08/09 Perfusion (PAH)

- a. Dynamic contrast enhancement
- b. Applications in breast tumors & brain
- c. Arterial spin labeling
- d. Blood volume (VASO, etc)
- e. Cerebral Metabolic Rate of Oxygen consumption

Tues 10/13/09 *Mid term exam*

Thurs 10/15/09 Diffusion (DKP)

- a. Physics of diffusion
- b. Diffusion tensor
- c. Fractional anisotropy

Tues 10/20/09 Applications of Diffusion (DKP)

- a. Correlation of FA with injury and development.
- b. Fiber tracking
- c. FA and fiber tracking applications – development, injury, anatomy, etc

Thurs 10/22/09 **Imaging Demonstration II.**

- a. DTI
- b. MRA
- c. MT
- d. ^1H spectroscopy

Tues 10/27/09 Basic Spectroscopy (DKP)

- a. Chemical shift Imaging
- b. Multinuclear

- c. Single vs. Multi-voxel encoding
- d. STEAM

Thurs 10/29/09 Spectroscopy Applications (DKP)

- a. NAA, lactate
- b. Normal values
- c. Results – proton spectroscopy disease
- d. Results – multinuclear spectroscopy

Tues 11/3/09 Neuro Cases II. (CDS)

- a. Stroke examples shown on MRA, DTI, perfusion
- b. Neurosurgical cases with DTI abnormalities
- c. Aging? Epilepsy with NAA abnormalities
- d. MT and multiple sclerosis

Thurs 11/5/09 BOLD Contrast (AHA)

- a. Basic theory heme oxygenation
- b. Hemodynamic response
- c. GRE & SE EPI sequence
- d. Mapping example – visual cortex

Tues 11/10/09 fMRI Applications (AHA)

- a. Task designs – Block, event, runs, epochs
- b. Cognitive subtraction
- c. Vision, motor, hearing, faces - basic
- d. Language & higher-order functions – basic

Thurs 11/12/09 **Imaging Demonstration III**

- a. 3D T1-, T2-weighted for structural analysis
- b. fMRI acquisition

Tues 11/17/09 Image Processing 1: Functional (AHA)

- a. Time series
- b. Hemodynamic response correction
- c. Retrospective data pooling
- d. Statistical considerations

Thurs 11/19/09 Functional Neuroimaging Applications (Guest lecturer)

Tues 11/24/09 Image Processing 2: Structural (CDS)

- a. RF correction
- b. Registration
- c. Segmentation
- d. Filtering
- e. Normalization

Thurs 11/26/09 **Thanksgiving**

Tues 12/1/09 Structural Neuroimaging Applications (CDS)

- a. Changes in structure with disease and age

b. High-resolution structural mapping

Thurs 12/3/09 MR Safety (PAH)

Tues 12/8/09 Presentations of individual projects.

Thurs 12/10/09 Presentations of individual projects. Continued

Finals week Dec 14 - Dec18

Final Exam (given during Finals week)

APPLICATION FOR NEW COURSE

6. Course to be offered (please check all that apply): Fall Spring Summer
7. Will the course be offered every year? YES NO
If NO, please explain: Alternates biennially with ANA 625: "Introduction to Functional Magnetic Resonance Imaging"
8. Why is this course needed?

There is no other course at UK which covers this increasingly important material.
9. a. By whom will the course be taught? Faculty of the Magnetic Resonance Imaging Center
b. Are facilities for teaching the course now available? YES NO
If NO, what plans have been made for providing them?

10. What yearly enrollment may be reasonably anticipated?
12 - 15
11. a. Will this course serve students primarily within the department? Yes No
b. Will it be of interest to a significant number of students outside the department? YES NO
If YES, please explain.

MRI is inherently interdisciplinary, with research and clinical applications in several basic science and applied science disciplines, e.g., mathematics, chemistry, physics, biology, computer science, medicine and engineering.
12. Will the course serve as a University Studies Program course¹? YES NO
If YES, under what Area? _____
¹AS OF SPRING 2007, THERE IS A MORTORIUM ON APPROVAL OF NEW COURSES FOR USP.
13. Check the category most applicable to this course:
 traditional – offered in corresponding departments at universities elsewhere
 relatively new – now being widely established
 not yet to be found in many (or any) other universities
14. Is this course applicable to the requirements for at least one degree or certificate at UK? Yes No
15. Is this course part of a proposed new program? YES NO
If YES, please name: _____
16. Will adding this course change the degree requirements for ANY program on campus? YES NO
If YES², list below the programs that will require this course:

²In order to change the program(s), a program change form(s) must also be submitted.

APPLICATION FOR NEW COURSE

17. The major teaching objectives of the proposed course, syllabus and/or reference list to be used are attached.
18. Check box if course is 400G or 500. If the course is 400G- or 500-level, *you must include a syllabus showing differentiation* for undergraduate and graduate students by (i) requiring additional assignments by the graduate students; and/or (ii) the establishment of different grading criteria in the course for graduate students. (See *SR 3.1.4*)

19. Within the department, who should be contacted for further information about the proposed new course?

Name: Charles D. Smith, MD Phone: 3-1113 Email: csmith@mri.uky.edu

20. Signatures to report approvals:

| | | | |
|---|--|--|-----------|
| DATE of Approval by Department Faculty | / | Reported by Department Chair | signature |
| DATE of Approval by College Faculty | / | Reported by College Dean | signature |
| * DATE of Approval by Undergraduate Council | / | Reported by Undergraduate Council Chair | signature |
| * DATE of Approval by Graduate Council | / | Reported by Graduate Council Chair | signature |
| * DATE of Approval by Health Care Colleges Council (HCCC) | / | Reported by Health Care Colleges Council Chair | signature |
| * DATE of Approval by Senate Council | Reported by Office of the Senate Council | | |
| * DATE of Approval by University Senate | Reported by Office of the Senate Council | | |

*If applicable, as provided by the *University Senate Rules*