FLORIDA ATLANTIC UNIVERSITY™

Graduate Programs—COURSE CHANGE REQUEST[1]

UGPC APPROVAL _____
UFS APPROVAL _____
SCNS SUBMITTAL _____
CONFIRMED _____
BANNER POSTED _____
CATALOG _____

DEPARTMENT: PHYSICS	COLLEGE: CHARLES E. SCHMIDT COLLEGE OF SCIENCE
COURSE PREFIX AND NUMBER: PHZ 6245	CURRENT COURSE TITLE: MEDICAL IMAGING PHYSICS
CHANGE(S) ARE TO BE EFFECTIVE (LIST TERM SPRING 2014	TERMINATE COURSE (LIST FINAL ACTIVE TERM):

CHANGE TITLE TO:

CHANGE PREFIX FROM: PHZ TO: RAT

CHANGE COURSE NO. FROM: 6245 TO: 6616

CHANGE CREDITS[2] FROM: TO:

CHANGE GRADING FROM: TO:

CHANGE DESCRIPTION TO: Course describes the basics of non-invasive imaging techniques, including Magnetic Resonance Imaging (MRI), functional MRI, Diffusion Tensor Imaging (DTI), electro-and magneto-encephalography (EEG, MEG). Course also covers analysis and visualization of high-dimensional datasets.

CHANGE PREREQUISITES/MINIMUM GRADES TO*:
Must be enrolled as graduate student

CHANGE COREQUISITES TO*:

CHANGE REGISTRATION CONTROLS TO:

*Please list both existing and new pre/corequisites, specify AND or OR, and include minimum passing grade.

Attach syllabus for **ANY** changes to current course information.

Should the requested change(s) cause this course to overlap any other FAU courses, please list them here.	Please consult and list departments that might be affected by the change(s) and attach comments.[3]

Faculty contact, email and complete phone number:
Armin Fuchs, fuchs@ccs.fau.edu **561-297-0125**

Approved by:	*Date:*
Department Chair:	2/6/13
College Curriculum Chair:	2/6/13
College Dean:	2/6/13
UGPC Chair: Nancy Kasm Polin	2/20/13
Graduate College Dean:	
UFS President:	
Provost:	

1. **Syllabus** must be attached; see guidelines for requirements: *www.fau.edu/provost/files/course syllabus.2011.pdf*
2. Review **Provost Memorandum: Definition of a Credit Hour** *www.fau.edu/provost/files/Definition_Credit_Hour_Memo_2012.pdf*
3. **Consent** from affected departments (attach if necessary)

Email this form and syllabus to *UGPC@fau.edu* **one week before** the University Graduate Programs Committee meeting so that materials may be viewed on the UGPC website prior to the meeting.

Medical Imaging Physics

RAT 6616 Fall 2013

Course: Rat 6616

Credits: 3

Prerequisites: None

Location: Behavioral Sciences #303

Time: Monday, Wednesday 11:00-12:20pm

Instructor: Dr. Armin Fuchs

Office: Behavioral Sciences #307

Phone: 561-297-0125

Email: fuchs@ccs.fau.edu

Office hours: Monday, Wednesday 10:00-11:00pm and by appointment

Description: The course is designed to procure a basic understanding of modern noninvasive imaging technologies and procedures to nonmedical students from the view point of physics. Specific technology covered in this course includes Magnetic Resonance Imaging (MRI), functional MRI (fMRI), electro- and magnetoencephalography (EEG and MEG) and Computed Tomography (CT). The course includes a visit to a diagnostic imaging center (University MRI, located in the Research Park on campus) and a two hour demonstration of multi-channel EEG paste-up and recording (EEG Lab room #401 on the 4th floor in BS 12). Analysis of spatiotemporal data is discussed and demonstrated in a programming session.

Topics: Magnetic resonance imaging (MRI) basics, magnets and currents. Magnetic materials.
Assignment: Lecture notes, Chapters 1&2 in Hornak

Spin-lattice and spin-spin interactions, relaxation times
Assignment: Lecture notes, Chapter 3 in Hornak (1)

Bloch equations and their solutions
Assignment: Lecture notes, Chapter 3 in Hornak (2)

Spatial encoding in MRI and scanning sequences
Assignment: Lecture notes, Chapter 6 in Hornak

Functional MRI (fMRI)
Assignment: Lecture notes, Chapter 13 in Hornak

Diffusion tensor imaging (DTI)
Assignment: Lecture notes and powerpoint presentation available on Blackboard

Computed Tomography and Radon transformation(CT)
Assignment: Midterm exam

Visit to imaging center
Assignment: Midterm exam

Magnetoencephalography (MEG)
Assignment: Lecture notes and powerpoint presentation available on Blackboard

Electroencephalography (EEG)
Assignment: Lecture notes and powerpoint presentation available on Blackboard

Reference free quantities
Assignment: Lecture notes and handout.

Time series analysis (single channel data)

Analysis of spatiotemporal data (with programing)
Assignment: Programming

Dimensionality reduction (with programming)
Assignment: Programming, Final exam

Visit to EEG lab
Assignment: Final exam

Literature: To be announced. Unfortunately, there is no single textbook that covers the course material. Handouts will be distributed, resources on the internet will be announced and certain lectures in powerpoint, lecture notes and other material will be made available on Blackboard. A good source for the first half of the semester is:
J.P. Hornak (2010). The Basics of MRI (hypertext book). Interactive Learning Software, Henietta, NY.
http://www.cis.rit.edu/htbooks/mri/

Grading: Midterm exam: 45% (take home exam, due 3/6/2013)
Final exam: 45% (take home exam, due 4/29/2013)
Attendance and contributions during class: 10%

Makeup: Late work is not accepted except in extraordinary circumstances.

To master the material covered in this course it is expected that the student will spend a minimum of two hours per week per credit hour on the out of classroom assignments.

The schedule of topics is subject to change during the semester, depending on how the class progresses and availability of the out of classroom activities.

Disability policy statement

In compliance with the Americans with Disabilities Act (ADA), students who require reasonable accommodations due to a disability to properly execute coursework must register with the Office for Students with Disabilities (OSD) -- in Boca Raton, SU 133 *(561-297-3880); in Davie, LA 240* (954-236-1222); *in Jupiter, SR 110 (561-799-8010); or at the Treasure Coast, CO* 117 (772-873-3441) *- and follow all OSD procedures.*

Code of Academic Integrity policy statement

Students at Florida Atlantic University are expected to maintain the highest ethical standards. Academic dishonesty is considered a serious breach of these ethical standards, because it interferes with the university mission to provide a high quality education in which no student enjoys an unfair advantage over any other. Academic dishonesty is also destructive of the university community, which is grounded in a system of mutual trust and places high value on personal integrity and individual responsibility. Harsh penalties are associated with academic dishonesty.

For more information see:
http://www.fau.edu/regulations/chapter4/4.001_Code_of_Academic_Integrity.pdf