PHYS 3309: Introduction to Medical Imaging (3 credit hours) – Fall 2018

Instructor: Dr. HyeongJun Kim
* Assistant Professor in the Department of Physics and Astronomy
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* Phone numbers: 956-665-2171 (office on the Edinburg campus)
  956-665-3136 (Emergency number – Department office in Edinburg, ESCNE 1.606)
  956-882-6779 (Emergency number – Department office in Brownsville. BLHSB 2.226)
* Office: ESCNE 3.619 (Edinburg)

Graduate Assistant: Ms. Guldauren Bissenbayeva
* Graduate Student in the Department of Physics and Astronomy (MSIS Physics Program)
* Email: guldauren.bissenbayeva01@utrgv.edu

Locations: BLHSB 2.312 (Brownsville, Building #7 on the map) and ELABS 185 (Edinburg, Building #34 on the map)

Hours (Lecture): Tuesdays and Thursdays 3:05 PM - 4:20 PM

Office Hours/Locations
* Tuesdays 9:30 AM - 10:45 AM or by appointments (at ESCNE 3.619 in Edinburg)
* Office hours in Brownsville: By Skype (please arrange time in advance)
  or by appointments (face-to-face meeting. The location will be announced later on.)

Course Information
* This course will look at the wide range of techniques used for medical imaging and the underlying physical principles they are based on. This course is an introduction to medical diagnosis imaging techniques, e.g. magnetic resonance imaging, computed tomography, and general imaging by x-rays. Topics covered also include the interaction of light on living cells and use of ionizing radiation in diagnosis and therapy. If time allows, this course will also cover biological imaging techniques on a molecular level such as FIONA, STORM, and light sheet microscopy.
* Prerequisites:
  : MATH 1314 and either PHYS 1402, PHYS 2426, PSCI 1422, CHEM 1312, or BIOL 1407 (or BIOL 1488)
* Textbook: An Introduction to Medical Physics (Editor: Muhammad Maqbool). Springer
  (Hardcover ISBN: 978-3-319-61538-7) (eBook ISBN: 978-3-319-61540-0)
  (Download available from UTRGV library website or other online booksellers)
  Recommended but not required.
* This course will be given via ITV method.

Course Learning Objectives
* Realize that ionizing radiation (gamma rays, X-rays) interacts with matter.
* Differentiate between the effects of low-LET and high-LET radiation on biological systems.
* Familiarize yourself with various medical imaging techniques.
* Understand underlying physical principles of the medical and biological imaging techniques.
* Identify risks involved in medical imaging and efforts to minimize unnecessary risks.
* In a certain medical situation, you should be able to determine which medical imaging techniques should be used for diagnostic purposes.
* Evaluate a medical imaging-related journal paper.
* Be an active learner by investigating relevant literatures by oneself and presenting it to peers.
**Homework/Grading Policies**

* Homework will be collected by Dr. Kim and TA.
* Late homework will be accepted until graded homework is returned. Note that there will be score penalty per each day for the late assignment. If you missed a homework due, please take a picture of your homework or scan it, then email it to Dr. Kim (hyeongjun.kim@utrgv.edu) with “[PHYS 3309]” in the subject line.
* In addition to excuses mentioned in the “ATTENDANCE” part in the next page, under extraordinary circumstances (e.g. sudden illness), additional chance for missed homework deadline may be given. Please try your best to inform Dr. Kim of the situation as soon as possible, and arrange necessary steps for justification (e.g. doctor’s note for illness), if it is do-able. Dr. Kim will determine the validity of the excuses.

* Grading Scale
  
  Quizzes: 10 %
  
  Homework: 20 %
  
  Attendance/Participation (presentation): 15 %
  
  First mid-term exam (Date: September 27, Thursday): 15 %
  
  Second mid-term exam (Date: November 1, Thursday): 15 %
  
  The final exam (Date: December 13, Thursday, 1:15 PM – 3:00 PM): 25 %

* Grading policy

<table>
<thead>
<tr>
<th>Percentage</th>
<th>Letter grade</th>
<th>GPA</th>
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<tbody>
<tr>
<td>90 – 100</td>
<td>A</td>
<td>4.0</td>
</tr>
<tr>
<td>80 – 89</td>
<td>B</td>
<td>3.0</td>
</tr>
<tr>
<td>70 – 79</td>
<td>C</td>
<td>2.0</td>
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<tr>
<td>60 – 69</td>
<td>D</td>
<td>1.0</td>
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<tr>
<td>Less than 60</td>
<td>F</td>
<td>0.0</td>
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* Important concepts that will be helpful in the test will be emphasized during classes. That is another reason why you need to attend all classes. Go over graded homework & quiz and their solutions, and try to fully understand the answer keys before tests.

**Calendar of Activities**

<table>
<thead>
<tr>
<th>Date</th>
<th>Event</th>
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<tbody>
<tr>
<td>August 28 (Tuesday)</td>
<td>First day of the PHYS 3309 classes</td>
</tr>
<tr>
<td>August 30 (Thursday)</td>
<td>Last day to add a course or register for fall 2018</td>
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<tr>
<td>September 3 (Monday)</td>
<td>Labor Day – No classes</td>
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<tr>
<td>September 12 (Wednesday)</td>
<td>Fall 2018 – Census day</td>
</tr>
<tr>
<td>September 27 (Thursday)</td>
<td>1st mid-term exam</td>
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<tr>
<td>November 1 (Thursday)</td>
<td>2nd mid-term exam</td>
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<tr>
<td>November 14 (Wednesday)</td>
<td>Last day to drop a course; will count toward the 6-drop rule</td>
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<tr>
<td>November 22-24</td>
<td>Thanksgiving Holiday – No classes</td>
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<tr>
<td>December 6 (Thursday)</td>
<td>Study Day – No classes</td>
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<tr>
<td>December 7 (Friday)-13 (Thursday)</td>
<td>Fall 2018 final exams</td>
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<tr>
<td>December 14 (Friday)-15 (Saturday)</td>
<td>For PHYS 3309: December 13 (Thursday) 1:15 PM – 3:00 PM</td>
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**UeTRGV Policy Statements**

**STUDENTS WITH DISABILITIES:**

Students with a documented disability (physical, psychological, learning, or other disability which affects academic performance) who would like to receive academic accommodations should contact Student Accessibility Services (SAS) as soon as possible to schedule an appointment to initiate services. Accommodations can be arranged through
SAS at any time, but are not retroactive. Students who suffer a broken bone, severe injury or undergo surgery during the semester are eligible for temporary services.

**Pregnancy, Pregnancy-related, and Parenting Accommodations**

Title IX of the Education Amendments of 1972 prohibits sex discrimination, which includes discrimination based on pregnancy, marital status, or parental status. Students seeking accommodations related to pregnancy, pregnancy-related condition, or parenting (reasonably immediate postpartum period) are encouraged to contact Student Accessibility Services for additional information and to request accommodations.

**Student Accessibility Services:**

**Brownsville Campus:** Student Accessibility Services is located in Cortez Hall Room 129 and can be contacted by phone at (956) 882-7374 (Voice) or via email at ability@utrgv.edu. **Edinburg Campus:** Student Accessibility Services is located in 108 University Center and can be contacted by phone at (956) 665-7005 (Voice), (956) 665-3840 (Fax), or via email at ability@utrgv.edu.

**MANDATORY COURSE EVALUATION PERIOD:**

Students are required to complete an ONLINE evaluation of this course, accessed through your UTRGV account (http://my.utrgv.edu); you will be contacted through email with further instructions. Students who complete their evaluations will have priority access to their grades. Online evaluations will be available on or about:

- **Module 1** October 4 – 10
- **Module 2** November 29 – December 5
- **Full Fall Semester** November 15 – December 5

**ATTENDANCE:**

Students are expected to attend all scheduled classes and may be dropped from the course for excessive absences. UTRGV’s attendance policy excuses students from attending class if they are participating in officially sponsored university activities, such as athletics; for observance of religious holy days; or for military service. Students should contact the instructor in advance of the excused absence and arrange to make up missed work or examinations.

**SCHOLASTIC INTEGRITY:**

As members of a community dedicated to Honesty, Integrity and Respect, students are reminded that those who engage in scholastic dishonesty are subject to disciplinary penalties, including the possibility of failure in the course and expulsion from the University. Scholastic dishonesty includes but is not limited to: cheating, plagiarism (including self-plagiarism), and collusion; submission for credit of any work or materials that are attributable in whole or in part to another person; taking an examination for another person; any act designed to give unfair advantage to a student; or the attempt to commit such acts. Since scholastic dishonesty harms the individual, all students and the integrity of the University, policies on scholastic dishonesty will be strictly enforced (Board of Regents Rules and Regulations and UTRGV Academic Integrity Guidelines). All scholastic dishonesty incidents will be reported to the Dean of Students.

**SEXUAL HARASSMENT, DISCRIMINATION, and VIOLENCE:**

In accordance with UT System regulations, your instructor is a “Responsible Employee” for reporting purposes under Title IX regulations and so must report any instance, occurring during a student’s time in college, of sexual assault, stalking, dating violence, domestic violence, or sexual harassment about which she/he becomes aware during this course through writing, discussion, or personal disclosure. More information can be found at www.utrgv.edu/equity, including confidential resources available on campus. The faculty and staff of UTRGV actively strive to provide a learning, working, and living environment that promotes personal integrity, civility, and mutual respect that is free from sexual misconduct and discrimination.
**COURSE DROPS:**
According to UTRGV policy, students may drop any class without penalty earning a grade of DR until the official drop date. Following that date, students must be assigned a letter grade and can no longer drop the class. Students considering dropping the class should be aware of the “3-peat rule” and the “6-drop” rule so they can recognize how dropped classes may affect their academic success. The 6-drop rule refers to Texas law that dictates that undergraduate students may not drop more than six courses during their undergraduate career. Courses dropped at other Texas public higher education institutions will count toward the six-course drop limit. The 3-peat rule refers to additional fees charged to students who take the same class for the third time.

**STUDENT SERVICES:**
Students who demonstrate financial need have a variety of options when it comes to paying for college costs, such as scholarships, grants, loans and work-study. Students should visit the Students Services Center (U Central) for additional information. U Central is located in BMAIN 1.100 (Brownsville) or ESSBL 1.145 (Edinburg) or can be reached by email (ucentral@utrgv.edu) or telephone: (888) 882-4026. In addition to financial aid, U Central can assist students with registration and admissions.

Students seeking academic help in their studies can use university resources in addition to an instructor’s office hours. University Resources include the Learning Center, Writing Center, Advising Center and Career Center. The centers provide services such as tutoring, writing help, critical thinking, study skills, degree planning, and student employment. Locations are:
- Learning center: BSTUN 2.10 (Brownsville) or ELCTR 100 (Edinburg)
- Writing center: BLIBR 3.206 (Brownsville) or ESTAC 3.119 (Edinburg)
- Advising center: BMAIN 1.400 (Brownsville) or ESWKH 101 (Edinburg)
- Career center: BCRTZ 129 (Brownsville) or ESSBL 2.101 (Edinburg)

**SPECIAL NOTES**
1. Cell phone use during the class is strictly forbidden.
2. Students who are taking upper division physics classes must attend the department colloquiums unless there is a Conflict. (Physics colloquiums: Friday 12-1 pm. Please check the department website for detailed schedules.)