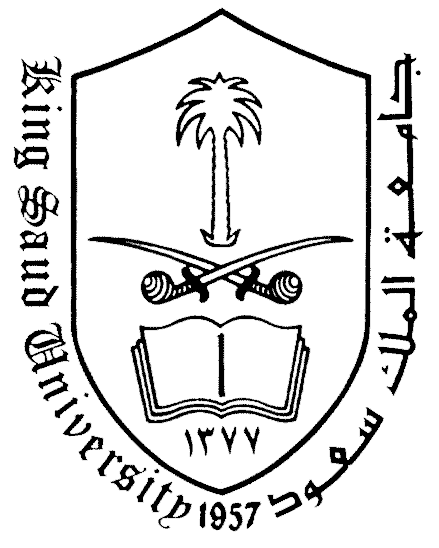
### Kingdom of Saudi Arabia

**The National Commission for Academic Accreditation & Assessment**



**COLLEGE OF APPLIED MEDICAL SCIENCES  
DEPARTMENT OF RADIOLOGICAL SCIENCES**

**[](http://faculty.ksu.edu.sa/74344/_layouts/4558.gif)**

## Course Specification

Course Title: **Clinical Practicum in N. M. TechnologyI**

Course Code: **RAD 432**

Course Instructor:

1. **Dr. Mohammed Alnafea**
2. **Tahani Al-Qahtani**

**Course Specification**

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| Institution ***King Saud University*** |
| College/Department ***College of Applied Medical Sciences/Radiological sciences*** |

**A Course Identification and General Information**

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| 1. Course title and code: ***Clinical Practicum in Nuclear Medicine TechnologyI.RAD432*** |
| 2. Credit hours  ***3*** |
| 3. Program(s) in which the course is offered.(If general elective available in many programs indicate this rather than list programs) ***Radiological Sciences*** |
| 4. Name of faculty member responsible for the course  ***Dr. Mohammed Alnafea, PhD & Mrs. Tahani Al-Qahtani, Msc*** |
| 5. Level/year at which this course is offered Level 6/3rd year |
| 6. Pre-requisites for this course (if any) ***RAD311*** |
| 7. Co-requisites for this course (if any) ***NA*** |
| 8. Location if not on main campus  ***Diriah, Olishah and many Hospitals*** |

**B Objectives**

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| 1. Summary of the main learning outcomes for students enrolled in the course.   1. ***Demonstrate an understanding of clinical applications of Nuclear Medicine.*** 2. ***Demonstrate an understanding of Radiation protection principles in Nuclear Medicine.*** 3. ***The course is designed to provide students with the principle of SPECT & PET as well as provide a review of many investigations such as bone, liver, spleen, gall - bladder, lung, brain, cardiac and kidney scans.*** 4. ***Demonstrate an understanding of patient care and patient preparation.*** |
| 2. Briefly describe any plans for developing and improving the course that are being implemented. (eg increased use of IT or web based reference material, changes in content as a result of new research in the field)   1. ***Assessment form will be distributed to students by the end of each course*** 2. ***Contents modification based on any new development or updated technology in the related field.*** |

**C. Course Description** (Note: General description in the form to be used for the Bulletin or Handbook should be attached)

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| 1 Topics to be Covered | | |
| Topic | No of  Weeks | Contacthours |
| ***SKELETAL SCINTIGRAPHY*** | **1** | **2** |
| ***PULMONARY SCINTIGRAPHY*** | **1** | **2** |
| ***RENAL SCINTIGRAPHY*** | **1** | **2** |
| ***ENDOCRINE SCAN ( THYROID )*** | **1** | **2** |
| ***ENDOCRINE SCAN ( PARATHYROID )*** | **1** | **2** |
| ***MYOCARDIAL SCNTIGRAPHY*** | **2** | **4** |
| ***1st Midterm Exam*** | **1** | **2** |
| ***SPECT/PET BASICS PRINCIPLES*** | **1** | **2** |
| ***GASTRIC SCINTIGRAPHY*** | **1** | **2** |
| ***BRAIN SCINTIGRAPHY*** | **1** | **2** |
| ***INVIVO / INVITRO CELL LABELLING*** | **1** | **2** |
| ***2nd Midterm Exam*** | **1** | **2** |
| ***Presentation/Attendance/case study*** | **13** | **39** |
| ***Oral Exam*** | **1** | **2** |
| ***Final Exam*** | **1** | **2** |

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| 2 Course components (total contact hours per semester): | | | |
| Lecture:  **28** | Tutorial:  **2** | Practical/Fieldwork/Internship:  **39** | Other:  ORAL EXAM 2 HRS |

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| 3. Additional private study/learning hours expected for students per week. (This should be an average :for the semester not a specific requirement in each week)  ***Students should spend a minimum of 3 hours per week.*** |

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| 4. Development of Learning Outcomes in Domains of Learning  For each of the domains of learning shown below indicate:   * A brief summary of the knowledge or skill the course is intended to develop; * A description of the teaching strategies to be used in the course to develop that knowledge or skill; * The methods of student assessment to be used in the course to evaluate learning outcomes in the domain concerned. |
| **a. Knowledge** |
| 1. Description of the knowledge to be acquired   ***Acquire knowledge about the principle of imaging of the following clinical application:***   1. **Skeletal scintigraphy.** 2. **Pulmonary scintigraphy.** 3. **Brain scintigraphy.** 4. **Renal scan.** 5. **Tumour Imaging** 6. **Myocardial perfusions scan.** 7. **SPECT/PET basic principles.** 8. **PET Clinical ApplicationsS** 9. **Gastric scintigraphy.** 10. **Endocrine scintigraphy.** 11. **Invivo/invitro labelling**. |
| (ii) Teaching strategies to be used to develop that knowledge   1. ***Lectures.*** 2. ***Practical session.*** 3. ***Case study.*** 4. ***Weekly assignments.*** 5. ***Oral presentation and oral exam performance.*** 6. ***Attend local symposium and workshop.*** |
| (iii) Methods of assessment of knowledge acquired  ***Examinations, assignment, case study report, oral presentation, oral exam and problem solving.*** |
| **b. Cognitive Skills** |
| (i) Cognitive skills to be developed   1. ***Critical thinking*** 2. ***Problem solving*** 3. ***Judgment call*** 4. ***Team work*** |
| (ii) Teaching strategies to be used to develop these cognitive skills   1. ***Clinical reports discussion*** 2. ***Assignments presentations*** 3. ***Oral exam performance.*** |
| (iii) Methods of assessment of students cognitive skills   * ***Problem solving and class discussion.*** * ***Assignment and oral presentation***. * ***Oral exam***. |
| **c. Interpersonal Skills and Responsibility** |
| (i) Description of the interpersonal skills and capacity to carry responsibility to be developed   1. ***Understanding the request forms and using all aspects of physics and patient care*** 2. ***Communicate effectively with patients, instructors, and clinical staff.*** 3. ***Observe and assist clinical staff with clinical cases***. |
| (ii) Teaching strategies to be used to develop these skills and abilities   1. ***Attending practical session and provide a written report.*** 2. ***Develop the presentation skills.*** 3. ***Self confident.*** 4. ***Develop computer and IT skills*** 5. ***Develop skills on academic writing.*** |
| (iii) Methods of assessment of students interpersonal skills and capacity to carry responsibility   1. ***Evaluation form should be filling by local on-site supervisor.*** 2. ***Evaluation of assignments and oral presentation.*** |
| **d. Communication, Information Technology and Numerical Skills** |
| (i) Description of the skills to be developed in this domain.   1. ***Effective communication with patient and clinical staff.*** 2. ***Assignment preparation and presentation.*** 3. ***Know how to use basic computer technology such as Microsoft office.*** |
| (ii) Teaching strategies to be used to develop these skills   1. ***Observation during clinical sessions and participating if possible.*** 2. ***Encouraging the use of the Internet, text books, and articles.*** |
| (iii) Methods of assessment of students numerical and communication skills   1. ***Class discussion.*** 2. ***Oral presentation evaluation.*** 3. ***Oral exam evaluation.*** |
| **e. Psychomotor Skills (if applicable)** |
| (i) Description of the psychomotor skills to be developed and the level of performance required   1. ***Students should learn how to act professionally at clinical circumstances*** 2. ***Student should apply knowledge learned at the class room in clinical situations*** |
| (ii) Teaching strategies to be used to develop these skills   1. ***Clinical rotations at different hospitals*** 2. ***Class participation*** 3. ***Clinical assignment*** 4. ***Oral presentation*** 5. ***Oral exam*** |
| (iii) Methods of assessment of students psychomotor skills   1. ***Practical sessions at the presence of the demonstrators*** 2. ***Practical examination*** 3. ***Students will be evaluated for different assignments.*** 4. ***Oral presentation.*** 5. ***Oral exam.*** |

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| 5. Schedule of Assessment Tasks for Students During the Semester | | | |
| Assessment | Assessment task (eg. essay, test, group project, examination etc.) | Week due | Proportion of Final Assessment |
| 1 | ***First midterm exam*** | **7** | **10** |
| 2 | ***Assignment*** | **Weekly** | **5** |
| 3 | ***Second midterm exam*** | **14** | **10** |
|  | ***Oral exam*** | **16** | **10** |
| 4 | ***Oral presentation*** | **15** | **10** |
| 5 | ***Case study report*** | **10** | **10** |
| 6 | ***Class attendance (+ Practical attendance)*** | **During the course** | **5** |
| 7 | ***Final exam*** | **17** | **40** |

**D. Student Support**

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| 1. Arrangements for availability of faculty for individual student consultations and academic advice. (include amount of time faculty are available each week) |

##### E Learning Resources

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| 1. Required Text(s)   * [**Essentials of Nuclear Medicine Imaging**](http://www.cardiotext.com/description/Essentials-Nuclear-Medicine-Imaging---Fred-A.-Mettler-Milton-J.-Guiberteau/9780721602011). Fred A. Mettler; Milton J. Guiberteau   SAUNDERS W B CO, Hardcover, 577 pages, 01/2006, 5/ed ISBN: 9780721602011   * [**Diagnostic Imaging: Nuclear Medicine**](http://www.cardiotext.com/description/Diagnostic-Imaging-Nuclear-Medicine---Kathryn-A.-Morton-Paige-B.-Clark/9781416033394)  [more...](http://www.cardiotext.com/description/Diagnostic-Imaging-Nuclear-Medicine---Kathryn-A.-Morton-Paige-B.-Clark/9781416033394)  Kathryn A. Morton; Paige B. Clark ISBN: 9781416033394 AMIRSYS, Hardback, 860 pages, 11/2007, 1/ed * [**Nuclear Cardiac Imaging: Principles and Applications**](http://www.cardiotext.com/description/Nuclear-Cardiac-Imaging-Principles-Applications--Ami-E.-Iskandrian-Ernest-V.-Garcia/9780195311198)  [more...](http://www.cardiotext.com/description/Nuclear-Cardiac-Imaging-Principles-Applications--Ami-E.-Iskandrian-Ernest-V.-Garcia/9780195311198)  Ami E. Iskandrian; Ernest V. Garcia ISBN: 9780195311198 OXFORD UNIVERSITY PRESS, Hardcover, 752 pages, 10/2008, 4/ed |
| 2. Essential References |
| 3- Recommended Books and Reference Material (Journals, Reports, etc) (Attach List) Nuclear Medicine Institutions Bad Berka [PET Center](http://www.zentralklinik-bad-berka.de/)  Bowman Gray School of Medicine [PET Center](http://www.rad.bgsm.edu/pet/web_page/main.htm)  Bowman Gray School of Medicine [Division of Radiological Sciences](http://www.rad.bgsm.edu/radmain/htmls/home/radhome.html)  Cedars-Sinai Medical Center [Nuclear Medicine](http://www.csmc.edu/medphys/nucmed/)  The Children's Hospital in Boston [Nuclear Medicine](http://nucmedweb.tch.harvard.edu/)  The Children's Hospital of Michigan [Positron Emission Tomography Center](http://pet.wayne.edu/)  Columbia-Presbyterian Medical Center [The Morton A. Kreitchman PET Center](http://www.cpmc.columbia.edu/pet/)  Crawford Long Hospital/Emory University [Cardiothoracic Research Lab](http://www.emory.edu/CRL/)  [Cyceron PET Research Center](http://www.cyceron.fr/)  Emory University [PET Center](http://www.cc.emory.edu/RADIOLOGY/pet.html)  Emory University[Radiology and Imaging](http://www.gen.emory.edu/medweb/medweb.radiology.html)  German Cancer Research Center [Medical PET Group](http://www.dkfz-heidelberg.de/pet/home.htm)  Guy's and St. Thomas' [The Clinical PET Centre](http://www-ipg.umds.ac.uk/pet/petcen.html)  Harvard University [Joint Program in Nuclear Medicine](http://www.med.harvard.edu/JPNM/TF.html)  Hines VAMC [Section on Nuclear Medicine](http://lunis.luc.edu/hines)  Hospital Infanta Christina [Nuclear Medicine](http://www.audinex.es/~jirayo/)  Indiana University[Radiology Department](http://foyt.indyrad.iupui.edu/HomePage.html)  Johns Hopkins University [CT Medical Imaging Lab](http://www.amil.jhu.edu/)  Johns Hopkins University [MRI Medical Imaging Lab](http://www.mri.jhu.edu/)  Keio University [Neural and Multimedia Center](http://synap.neuro.sfc.keio.ac.jp/)  Loyola University of Chicago [Section on Nuclear Medicine](http://www.lunis.luc.edu/)  Mount Sinai Medical Center [PET Lab](http://www.mssm.edu/petlab/)  NYU [Nuclear Medicine](http://nucmed.nyu.edu/)  Northwestern University [Nuclear Medicine](http://lydgate.nums.nwu.edu/gme/nuclearm.htm)  [Paul Scherrer Institute for PET](http://pss023.psi.ch/)  Penn State University [Department of Radiology](http://www.xray.hmc.psu.edu/)  Royal Prince Alfred Hospital [PET Department](http://www.cs.nsw.gov.au/rpa/pet/home.html)  Saint Louis University Health Sciences Center [Nuclear Medicine](http://165.134.33.50/)  SUNY Buffalo [Nuclear Medicine and PET](http://www.nucmed.buffalo.edu/)  SUNY at Syracuse [Nuclear Medicine](http://www.hscsyr.edu/~HELLWIGB/nucs.html)  Szent-Gyorgyi Albert Medical University [Dept. of Nuclear Medicine](http://ss10.numed.szote.u-szeged.hu)  UCLA [Department of Molecular and Medical Pharmacology](http://www.nuc.ucla.edu/)  Turku University [PET Center](http://www.utu.fi/med/pet) |
| 4-.Electronic Materials, Web Sites etc  -Basic Physics of Nuclear Medicine”. From Wikibooks, [**http://en.wikibooks.org/wiki/Basic\_Physics\_of\_Nuclear\_Medicine**](http://en.wikibooks.org/wiki/Basic_Physics_of_Nuclear_Medicine) |
| 5- Other learning material such as computer-based programs/CD, professional standards/regulations Nuclear Medicine Educational Software [Atlas of SPECT Brain Perfusion](http://www.med.harvard.edu/BWHRad/BrainSPECT/BrSPECT.html)  [Digital filtering in nuclear medicine](http://www.biomed.abdn.ac.uk/~mph469/nm.html) by Sooriyajeevan  [DOE Human Irradiation Experiments](http://www.eh.doe.gov/ohre/home.html) data  [DoseNET](http://www.orau.gov/ehsd/dosenet.htm) Radiation Internal Dose Information Center, Oak Ridge Institute for Science and Education  [Hypertextbook of Radiology](http://chorus.rad.mcw.edu/chorus.html) Medical College of Wisconsin  [Hyperthyroidism](http://www-med.stanford.edu/MedSchool/DGIM/Teaching/Modules/hyperthyroidism.html) Primary Care Teaching Module  [Let's Play PET!](http://www.nuc.ucla.edu/html_docs/crump/lpp.html)  [Medical Physics on the Internet and the World-Wide Web](http://www-ipn.unil.ch/WWW_Root/WWW_PET/Habib/medphys.html)  [Nuclear Medicine Review Handbook](http://nuc-med-read.uthscsa.edu/) University of Texas Health Science Center  [Pediatric Dosimetry](http://www.mallinckrodt.nl/nucmed/noframes/nuclear/dosimetr.htm)  [Physical Characteristics of Nuclear Medicine Images](http://www.med.harvard.edu/BWHRad/education/online/physics/MooreNM/PhysCharacLesson.html) Stephen C Moore, PhD  [Physics](http://www.med.harvard.edu/JPNM/physics/physics.html) Joint Program in Nuclear Medicine  [Nuclear Medical Imaging](http://www.ocs.mq.edu.au/~rlarkin/OSEM.html)  [Graduate Diploma and Masters in Nuclear Medicine](http://www.health.newcastle.edu.au/edu/mrt/gdmrt.htm)  [Table of the Nuclides](http://www.dne.bnl.gov/CoN/index.html)  [Thyroid Nodule Guidelines](http://www.aace.com/guidelines/nodule.html)  [The Visible Human Project](http://www.nlm.nih.gov/extramural_research.dir/visible_human.html)  [Technegas](http://jcsmr.anu.edu.au/technegas/) Nuclear Medicine Teaching Files [Joint Program in Nuclear Medicine](http://count51.med.harvard.edu/JPNM/TF.html)  My PET [Haluk Alibazoglu](http://www.ameripet.net/mypet.html)  [UCLA PET](http://www.nuc.ucla.edu/lpp/clinicalcases/clincasemenu.html)  [University of North Carolina](http://sunsite.unc.edu/jksmith/UNC-Radiology-Webserver/NuclearMedicine.html)  [World Wide Web Medical Teaching Files](http://vub.vub.ac.be/~stadnik/im_menu.html) Vrije Universiteit Brussel  [Washington University](http://gamma.wustl.edu/home.html) Nuclear Medicine Forums [Nuclear Medicine NewsPage](http://www.newspage.com/NEWSPAGE/cgi-bin/walk.cgi/NEWSPAGE/info/d15/d8/d23/)  [Computer/Instrumentation Council SNM](http://gamma.wustl.edu/tf/caic.html)  [LARG\*net](http://www.largnet.uwo.ca)  [LARG\*net Conferencing Introductory Page](http://johns.largnet.uwo.ca/~caucus/LARGNET/)  [LUNIS](http://wwwd.lunis.luc.edu:80/lunis/) Nuclear Medicine Resources [NMHC Library: Medical Specialties - Radiology & Nuclear Medicine](http://www.nmmc.com/libweb/medstaff/radiol.htm)  [Browser](http://www.xs4all.nl/~dschonf/)  [Calendar of Meetings](http://nucmed.jr2.ox.ac.uk/nucmedcal.txt)  [Internet CME](http://netcme.wustl.edu/)  [Medical Physics on the Internet](http://www-ipn.unil.ch/WWW_Root/WWW_PET/Habib/medphys.html)  [NucMedNet-Nuclear Medicine Resources](http://www.nucmednet.com)  [Protocol Index](http://www.largnet.uwo.ca/nucmed/proto/index.html)  [Procedures Index](http://www.snm.org/guide.html)  [Resources](http://johns.largnet.uwo.ca/nucmed/index.html) |

**F. Facilities Required**

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| Indicate requirements for the course including size of classrooms and laboratories (ie number of seats in classrooms and laboratories, extent of computer access etc.) |
| 1. Accommodation (Lecture rooms, laboratories, etc.)  ***Class room 2 hour/week*** |
| 2. Computing resources  ***Audio-visual facilities (computer and data show)*** |
| 3. Other resources (specify --eg. If specific laboratory equipment is required, list requirements or attach list)  ***-Nuclear Medicine equipment available at different sites*** |

**G Course Evaluation and Improvement Processes**

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| 1 Strategies for Obtaining Student Feedback on Effectiveness of Teaching  ***Assessment at the end of the course.***  ***Questionnaires to get student feedback*** |
| 2 Other Strategies for Evaluation of Teaching by the Instructor or by the Department  ***Self assessment exercise*** |
| 3 Processes for Improvement of Teaching |
| 4. Processes for Verifying Standards of Student Achievement (eg. check marking by an independent faculty member of a sample of student work, periodic exchange and remarking of a sample of assignments with a faculty member in another institution)  ***Not Yet Implemented*** |
| 5 Describe the planning arrangements for periodically reviewing course effectiveness and planning for improvement.  ***Not Yet Implemented*** |