New Course Request

Check Appropriate Boxes: Undergraduate credit [x] Graduate credit [ ] Professional credit [ ]

1. School/Division Nursing & Health Professions
2. Academic Subject Code AHLT
3. Course Number R483 (must be cleared with University Enrollment Services)
4. Instructor Medical Imaging Faculty
5. Course Title Clinical Practicum: Magnetic Resonance Imaging
   Recommended Abbreviation (Optional) (Limited to 32 Characters including spaces)
6. First time this course is to be offered (Semester/Year): Fall 2009
7. Credit Hours: Fixed at or Variable from 0.5 to 8
8. Is this course to be graded S-F (only)? Yes [x] No [ ]
9. Is variable title approval being requested? Yes [x] No [ ]
10. Course description (not to exceed 50 words) for Bulletin publication: Clinical experience in the performance of magnetic resonance imaging studies. Course will give students the opportunity to acquire skills necessary to obtain high quality MRI images, to objectively alter protocols based on patient pathology or physical condition, identify image quality problems and make appropriate corrections.
11. Lecture Contact Hours: Fixed at or Variable from to
12. Non-Lecture Contact Hours: Fixed at or Variable from 0.5 to 8
13. Estimated enrollment: 15 of which 0 percent are expected to be graduate students.
14. Frequency of scheduling: Fall/Spring Will this course be required for majors? Yes
15. Justification for new course: To allow BS/MS/PhD majors to complete clinical degree requirements
16. Are the necessary reading materials currently available in the appropriate library? Yes
17. Please append a complete outline of the proposed course, and indicate instructor (if known), textbooks, and other materials. Attached
18. If this course overlaps with existing courses, please explain with which courses it overlaps and whether this overlap is necessary, desirable, or unimportant.

A copy of every new course proposal must be submitted to departments, schools, or divisions in which there may be overlap of the new course with existing courses or areas of strong concern, with instructions that they send comments directly to the originating Curriculum Committee. Please append a list of departments, schools, or divisions thus consulted.

Submitted by: [Signature] Date 4/15/09
Department Chairman/Division Director

Approved by: [Signature] Date 4/17/09
Dean

[Signature] Date
Chancellor/Vice-President

[Signature] Date
University Enrollment Services

After School/Division approval, forward the last copy (without attachments) to University Enrollment Services for initial processing, and the remaining four copies and attachments to the Campus Chancellor or Vice-President.

U.S. 724 University Enrollment Services Final—White; Chancellor/Vice-President—Blue; School/Division—Yellow; Department/Division—Pink; University Enrollment Services Advance—White
Course: AHLT-R 483 Clinical Practicum: Magnetic Resonance Imaging
Professor: Jim H. Howard, R.T. (R), MS.Ed., Clinical Assistant Professor
Office: Northside Hall, Room 405
Office Hours: By Appointment or following class
Telephone: Office: (574) 520-5569
Email: jhhoward@iusb.edu
Prerequisite: As stated in the course description
Co-requisites: All courses required: R404 and R405
Textbooks: Competency Evaluation Handbook
Gary Randle, M.S., R.T.(R)
Normal Findings in CT and MRI
Torstem B. Moeller
MRI Parameters and Positioning
Torstem B. Moeller

CLASSES BEGIN: August 31, 2009
Holidays/Breaks: Labor Day, September 7, 2009
Thanksgiving Break, November 25-26, 2009
Classes End: December 12, 2009
Final Exam: December XX, 2009

Introduction
The following is a concise presentation of the above-named course. The student should retain this document for the duration of the program.

Course Description
Clinical experience in the performance of magnetic resonance imaging studies. Course will give students the opportunity to acquire skills necessary to obtain high quality MRI images, to objectively alter protocols based on patient pathology or physical condition, identify image quality problems and make appropriate corrections.

Course Rationale
Technologists performing a MRI must be able to competently perform basic protocols, recognize the need for altering the standard protocol, be able to appropriately alter a protocol, and recognize equipment and patient considerations affecting image quality. The technologist is responsible for maintaining a safe environment in and around the MRI room. This course allows the student the necessary supervised clinical education to become proficient in these skills.

Grading Procedure
Your clinical grade will be calculated based on the following breakdown. It will be based on the number of competencies satisfactorily completed, attendance, evaluations and correctly finished paperwork at the end of the semester.

1. Competencies 70%
2. Mid-Semester Evaluation 10%
3. Final evaluation and assignments 10%
4. Completed paperwork 10%

Total Grade Percentage 100%

The grading scale will be as follows:

<table>
<thead>
<tr>
<th>100 = A+</th>
<th>91 = B+</th>
<th>82 = C+</th>
<th>73 = D+</th>
<th>64 - 0 = F</th>
</tr>
</thead>
<tbody>
<tr>
<td>99 - 93 = A</td>
<td>90 - 84 = B</td>
<td>81 - 75 = C</td>
<td>72 - 66 = D</td>
<td>92 = A-</td>
</tr>
</tbody>
</table>
Withdrawal Policy:
Any other policies/procedures not addressed in this syllabus can be found in the IU South Bend Radiography program Student Handbook, page 23.

<table>
<thead>
<tr>
<th>Withdrawal Dates:</th>
<th>Automatic “W” Withdrawal Deadline</th>
<th>September 7-26</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Withdrawal with Grade of “W” or “F”</td>
<td>September 28-November 6</td>
</tr>
<tr>
<td></td>
<td>Last Day to Withdraw (5:00 p.m.)</td>
<td>November 6</td>
</tr>
</tbody>
</table>

*Withdrawal from any core professional radiography course will adversely affect the student's enrollment in subsequent courses due to the nature of the program. Please refer to the radiography Student Handbook for details.

Methodology:
- **Procedural Observation:** each student will be responsible for observing all areas of performance for successful completion of an MRI procedure. This will be made available by the fact that there will be only one student per site.

- **Case Discussions:** each student will initiate discussion and take part in discussions concerning the performance of MRI procedures on a daily basis.

- **Research:** It is expected that each student will partake in research on topics which they may not be familiar with and report back to the staff or faculty in a timely fashion.

- **Individual Conferences:** students are welcome to request conferences with any faculty for edification of their learning experiences.

- **Competency Evaluations:** the student is to demonstrate progress both academically and practically through performance at a satisfactory level the competencies required for each semester.

- **Written Presentations:** each student will keep a running log of procedures and evaluations which will be submitted at the end of the semester and evaluated for a grade. The grade will be assessed based on neatness, accuracy, and completeness.

Accommodations:
If you require an accommodation, academic adjustment, or special service due to a disability, please inform the professor.

Attendance:
Attendance is mandatory and part of your semester grade. Those students absent from more than two classes will have their course grade lowered by one letter grade. Cases of documented absences due to health/personal reasons will be reviewed by the professor. **It is the student’s responsibility to contact the professor for make-up material following an absence.**

1. Students may not miss more than three (3) days from clinical experience in any one semester. A student will have one (1) personal day each semester. Two more days may be missed, but must be made up to pass any clinical experience course. If the student has an absence of more than one (1) clinical day in a row due to unavoidable circumstances, that absence could be considered one occurrence at the discretion of the program faculty. Exam week of each semester is set-aside for students who need to make up missed time. Students will fill out a contract and be obligated to make up that time as stated in that contract. If the student fails to meet the contract, additional days will be added to those already missed and will reflect on their grade for that semester. Contracts are to be picked up in professor's office.

2. Personal days may not be accumulated and used in any other semester. If you chose not to use that day, it simply is lost.

3. Clinical Experience begins in the fall semester. Students will be excused for all legal holidays and breaks that are recognized by Indiana University South Bend. Students will also observe holiday(s) or other special days of the clinical affiliate they are assigned to at the time of the occasion without penalty.
4. All clinical absences due to any reason other than an extended illness must be made up before the beginning of the next semester. Failure to do so will result in an incomplete grade in clinical experience for that semester and it not satisfied as required in the college handbook, the student will get an unsatisfactory grade for that course.

5. A student missing more than three (3) days must retake the entire semester’s clinical rotation the next time the course is offered if space is available. Since clinical experience rotations are only offered on a yearly basis, the student will have to wait an entire year to complete that clinical course. A student who does not satisfactorily complete the clinical experience rotation during a semester may complete the didactic courses for that semester upon approval of the program coordinator.

6. Students are required to have the clinical faculty sign them in and out for each clinical day on their log sheet. The student is not allowed to sign for another student.

7. To report an absence, the student will notify clinical faculty AND the program coordinator at least one hour PRIOR to reporting time. (Note: DO NOT CALL the IU South Bend Radiography office on campus.)

8. If the absence is more than one day, the student must notify the program director. Abuse of this rule could result in suspension or expulsion from the clinical affiliate and/or program.

9. If a student has a need for time off or other special arrangements, the student must first obtain permission from the program director and approval of the affiliate’s clinical instructor.

10. Students will not be assigned or allowed to participate more than forty (40) hours a week or eight (8) hours a day in clinical experience and didactic education combined.

**Learning Process:**

This is the responsibility of both the professor and the student. It is the responsibility of the professor to present material in a concise manner utilizing all educational resources available. The student must first be familiar with the material as assigned (pre-class preparation), record the information the professor presents, relate it to the text, and combine them into an easily learned pattern. Once the pattern is set, the student reviews and studies until the material has been learned.

Another responsibility of the student is to maintain a prompt and consistent attendance record. Each and every hour of class is extremely important. Your learning process will be severely impaired if you are not there to acquire the notes from that class. When you do miss a class, **it is your responsibility** to find out what took place in that class and to obtain notes and assignments.

Remember, the learning process requires the cooperation of all of us. Help the educator to do their portion by asking questions if you do not understand the material, the only way they can tell if something is confusing is to hear about it from you.

**Course Objectives**

Upon completion of their clinical education, the student will be able to:

1. Maintain a safe work environment for patients, visitors, and healthcare workers
2. Properly schedule and pre-screen patient
3. Communicate professionally with the patient and with members of the staff
4. Perform daily routine examinations based on normal protocols
5. Perform archiving procedure and filming
6. Identify need to modify protocol and successfully perform modification
7. Identify image quality problems and identify probable cause and recommend appropriate solution
8. Identify indications for MRI imaging procedures
9. Perform and monitor quality assurance tests
10. Perform system start-up and shutdown
I. Preliminary Patient Assessment
   A. Introduction
      1. Correlate clinical history to the requested exam
      2. Correlate reported physical exam findings to the requested exam
      3. Correlate surgical, accidental and occupation history to ensure proper precautions
      4. Properly screen patients for contraindications
      5. Monitor the patient to ensure proper attire and that no unnecessary metals enter the exam room

II. Preliminary Preparation
   A. Requisition evaluation
      1. Identify procedure to be followed for requested exam
      2. Identify the reason for the requested exam
      3. Identify any conditions that exist to change routine of procedure
   B. Patient identification
      1. Enter patient name and hospital number and other pertinent information
   C. Room readiness
      1. Prepare clean, comfortable and safe environment
      2. Demonstrate proper precautions in the prevention of disease transmission
      3. Have the necessary accessory equipment available
      4. Monitor the linen and supplies, and restock when necessary
      5. Have the machine ready for the patient, to include:
         a. QA performed
         b. Correct protocol for the required exam
         c. Selection of appropriate transducer for study
   D. Patient preparation
      1. Demonstrate knowledge of proper patient preparation required for requested exam
      2. Demonstrate knowledge of action required if the patient requires sedation
      3. Demonstrate knowledge of action required for allergic reactions

III. Patient Care and Handling
   A. Procedure
      1. Identify the correct patient and check the name band if appropriate. Verify patient and appropriate exam
      2. Introduce yourself to the patient
      3. Question and record any relevant patient clinical history for the exam
      4. Explain in layman’s terms to the patient a brief summary of the nature of the exam
      5. Speak with the patient in a professional manner to alleviate any fears expressed by the patient
      6. Demonstrate empathy when confronting the concerns of the patient
      7. Demonstrate professional ethics by preserving the patient’s modesty
      8. Assist the patient into the examining room and into a comfortable position
      9. Demonstrate the ability to give proper instructions to optimize patient

IV. Imaging Technique
   A. Patient positioning
      1. Position the patient correctly and comfortably (so that the patient can successfully complete the exam) on the table
      2. Demonstrate the proper patient positioning required for the requested exam
      3. Demonstrate the proper position variations and technical adjustments necessary for an optimum image due to variations in body habitus
   B. Equipment utilization
      1. Perform quality assurance testing
      2. Select the appropriate receiver coil for exam
      3. Demonstrate proper patient position to obtain maximum transmit and receive signal
      4. Select monitoring devices and support equipment as required by patient condition
   C. Imaging skills
      1. Perform tuning techniques for procedure
      2. Utilize proper protocols for producing optimal images
      3. Obtain correlation of requested exam to history and diagnosis to ensure appropriate procedure is performed
      4. Identify appropriate planes for a particular exam
      5. Modify protocols as required to produce optimal images
      6. Produce optimal images through entire region of interest in proper planes
      7. Identify artifacts if present and correct problem
D. Pathology
1. Identify pathology demonstrated
2. Utilize additional steps required if pathology is identified
3. Utilize additional steps required if pathology is not identified

E. Dismissing the patient
1. Properly remove patient from examination table to mode of transportation
2. Give post-procedural instructions as necessary

V. Imaging
A. Correct windows
1. Demonstrate the ability to choose proper windowing and filming format if appropriate
2. Demonstrate ability to understand the windowing as it relates to signal intensity

B. Labeling
1. Demonstrate the ability to correctly label images as required

C. Technical quality
1. Demonstrate the correct use of the imaging windows in the display of the finished image
2. Demonstrate proper image recording and processing procedures
3. Identify images of acceptable and unacceptable technical quality
4. Sort images and arrange films in proper order
5. Demonstrate archive, storage and retrieval functions

VI. Measurements
A. Obtaining measurements
1. Demonstrate the ability to obtain all measurements required for the requested exam
   a. Region of interest
   b. Distance measurements

VII. Work Efficiency
A. Requirements
1. Demonstrate ability to work with minimal supervision
2. Demonstrate an awareness of the cost of the exam by keeping department costs and patient charges at a feasible minimum without sacrificing the quality of the exam
3. Perform the exam in a competent fashion
4. Demonstrate flexibility when adjusting technical factors to obtain optimal images
5. Demonstrate the ability to discriminate between satisfactory scans and unsatisfactory images for image recording
6. Complete all paper work required for an exam in order to maintain correct hospital records

VIII. Anatomy
A. Requirements
1. Recognize and display all pertinent anatomy relating to the prescribed examination
2. Identify normal variants in anatomical conditions
3. Identify anatomical orientations related to prescribed examination and suspected pathology

IX. Image Viewing
A. Requirements
1. Sort and display the MR images in an appropriate manner for radiologist interpretation
2. Using MR terminology, describe the exam identifying all structures pertinent to the exam as demonstrated on the images
3. Emphasize any pathology (or abnormalities) which was identified
MRI: Clinical Competence Requirements

General Requirements

Candidates must complete the mandatory and elective requirements below, demonstrating appropriate:

- Patient preparation in metal screening, including evaluation of requisition or medical record, preparation of exam room, identification of patient, infection control procedures (i.e., standard precautions), patient assessment, and instruction concerning the procedure
- Exam protocol, including patient positioning, scanning parameter selection, image display, filming if appropriate, image annotation and labeling, archiving, and documentation of procedure
- Image evaluation, including image quality, optimal demonstration of anatomic region and pathology, and exam completeness

The candidate's clinical education should include variation in patient characteristics, and provide ample opportunity for demonstration of both normal and variant anatomy, as well as important pathologies and medical conditions.

A variety of instructional methods may be useful for teaching the clinical skills identified in this document. For purposes of satisfying these requirements, candidates must be evaluated while scanning actual patient. Simulation is not acceptable for the final competence assessment.

Mandatory Procedures

- Candidates must demonstrate experience in all of the 17 mandatory procedures

Elective Procedures

- Candidates must demonstrate experience in at least 10 of 21 elective procedures.

Please see your Competency Evaluation Handbook for further information and forms used in the CES.
**MANDATORY PATIENT CARE**

<table>
<thead>
<tr>
<th>MANDATORY Patient Care</th>
<th>Date Completed</th>
<th>Competence Verified By</th>
</tr>
</thead>
<tbody>
<tr>
<td>1 Vital signs (temperature, pulse, respiration, and blood pressure)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>2 CPR (certification required)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>3 Sterile technique</td>
<td></td>
<td></td>
</tr>
<tr>
<td>4 Universal (Standard) Precautions</td>
<td></td>
<td></td>
</tr>
<tr>
<td>5 Transfer of patients</td>
<td></td>
<td></td>
</tr>
<tr>
<td>6 Care of patient medical equipment (O₂, IV)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>7 Venipuncture</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

**MRI EXAMINATIONS**

*NOTE - All 17 mandatory (M) comps must be accomplished; 10 of the 21 electives (E) must be accomplished*

<table>
<thead>
<tr>
<th>PROCEDURES</th>
<th>Date Completed</th>
<th>Competence Verified By</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Head and Neck</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>1 Brain with contrast</td>
<td></td>
<td>M</td>
</tr>
<tr>
<td>2 Brain without contrast</td>
<td></td>
<td>M</td>
</tr>
<tr>
<td>3 Internal auditory canal</td>
<td></td>
<td>M</td>
</tr>
<tr>
<td>4 Orbit</td>
<td></td>
<td>E</td>
</tr>
<tr>
<td>5 Pituitary</td>
<td></td>
<td>M</td>
</tr>
<tr>
<td>6 MRA brain</td>
<td></td>
<td>M</td>
</tr>
<tr>
<td>7 Soft tissue neck (inc. thyroid, trachea, nasopharynx)</td>
<td>E</td>
<td></td>
</tr>
<tr>
<td>8 MRA carotid</td>
<td></td>
<td>M</td>
</tr>
<tr>
<td><strong>Spine</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>9 Thoracic</td>
<td></td>
<td>M</td>
</tr>
<tr>
<td>10 Lumbar</td>
<td></td>
<td>M</td>
</tr>
<tr>
<td>11 Cervical</td>
<td></td>
<td>M</td>
</tr>
<tr>
<td>12 Sacrum/coccyx</td>
<td></td>
<td>E</td>
</tr>
<tr>
<td><strong>Thorax</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>13 Brachial Plexus</td>
<td></td>
<td>E</td>
</tr>
<tr>
<td>14 Mediastinum</td>
<td></td>
<td>E</td>
</tr>
<tr>
<td>15 Cardiac</td>
<td></td>
<td>E</td>
</tr>
<tr>
<td>16 Breast</td>
<td></td>
<td>E</td>
</tr>
<tr>
<td>17 Great Vessels</td>
<td></td>
<td>E</td>
</tr>
<tr>
<td><strong>Abdomen And Pelvis</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>18 Abdomen</td>
<td></td>
<td>M</td>
</tr>
<tr>
<td>19 Biliary</td>
<td></td>
<td>E</td>
</tr>
<tr>
<td>20 Abdominal MR angiography</td>
<td></td>
<td>M</td>
</tr>
<tr>
<td>21 Male Pelvis</td>
<td></td>
<td>E</td>
</tr>
<tr>
<td>22 Female Pelvis</td>
<td></td>
<td>M</td>
</tr>
<tr>
<td><strong>Musculoskeletal</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>23 Elbow</td>
<td></td>
<td>E</td>
</tr>
<tr>
<td>24 Wrist</td>
<td></td>
<td>M</td>
</tr>
<tr>
<td>25 Hand</td>
<td></td>
<td>E</td>
</tr>
<tr>
<td><strong>MRI Procedure</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>26 Hip/bony pelvis</td>
<td></td>
<td>M</td>
</tr>
<tr>
<td>27 Ankle</td>
<td></td>
<td>M</td>
</tr>
<tr>
<td>28 Shoulder</td>
<td></td>
<td>M</td>
</tr>
<tr>
<td>29 Foot</td>
<td></td>
<td>E</td>
</tr>
<tr>
<td>30 Long bones</td>
<td></td>
<td>E</td>
</tr>
<tr>
<td>31 Knee</td>
<td></td>
<td>M</td>
</tr>
<tr>
<td>32 Temporomandibular joint</td>
<td></td>
<td>E</td>
</tr>
<tr>
<td>33 MR Arthrography</td>
<td></td>
<td>E</td>
</tr>
</tbody>
</table>
## MRI EXAMINATIONS: Continued

<table>
<thead>
<tr>
<th>PROCEDURES</th>
<th>Date Completed</th>
<th>Competence Verified By</th>
</tr>
</thead>
<tbody>
<tr>
<td>Special Imaging Procedures</td>
<td></td>
<td></td>
</tr>
<tr>
<td>34 MRV</td>
<td></td>
<td>E</td>
</tr>
<tr>
<td>35 Image Post-processing</td>
<td></td>
<td>E</td>
</tr>
<tr>
<td>36 Extremity MR angiography</td>
<td></td>
<td>E</td>
</tr>
<tr>
<td>37 Spectroscopy</td>
<td></td>
<td>E</td>
</tr>
<tr>
<td>38 fMRI</td>
<td></td>
<td>E</td>
</tr>
</tbody>
</table>

## QUALITY CONTROL

**MANDATORY - Experience Requirement for Quality Control:**
Interpret the results of the quality control procedures as listed below: Reps 1 for ALL

<table>
<thead>
<tr>
<th>Procedure</th>
<th>Date Completed</th>
<th>Competence Verified By</th>
</tr>
</thead>
<tbody>
<tr>
<td>1 Signal to Noise</td>
<td></td>
<td></td>
</tr>
<tr>
<td>2 Center Frequency</td>
<td></td>
<td></td>
</tr>
<tr>
<td>3 Image Quality Control</td>
<td></td>
<td></td>
</tr>
<tr>
<td>4 Transmitter gain or attenuation</td>
<td></td>
<td></td>
</tr>
<tr>
<td>5 Geometric accuracy</td>
<td></td>
<td></td>
</tr>
<tr>
<td>6 Equipment inspection (coils, cables, door seals...)</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>