



SURG 707, RADIOLOGY ELECTIVE ROTATION SYLLABUS
 ROTATION LENGTH TBD
 CLINICAL EDUCATION

1. Contact Information

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2. Course Description/Overview

The Radiology clerkship is scheduled with a preceptor who is an expert in this field. The student will experience the day to day activities of clinicians as he/she assists in the care of their patients. Exposure to patients in the clinic setting will give the student opportunity to practice interview, examination, documentation and presentation skills. These activities help develop student’s clinical reasoning and provide opportunities to learn necessary professional activities. The student may be afforded by the preceptor the opportunity to participate in procedures as the preceptor determines his/her readiness. The curriculum for this rotation is based on nationally recognized recommendations from the Alliance of Medical Student Educators. For further reading, visit [AMSER](#).

3. Course Purpose/Goals

The purpose of this Radiology clerkship is to provide the student with a broad exposure to diagnostic imaging and basic image guided interventions. The student should develop an understanding of the advantages and limitations of the various key imaging modalities; the clinical basis for appropriate imaging utilization; how images are obtained; how image guided procedures are performed; how to provide informed advice to patients about imaging; how imaging is incorporated into medical problem solving; and the basics of medical imaging interpretation as applied to routine and emergency medical practice. Completion of this course should prepare the student well for the COMAT and COMLEX exams, give a foundation for knowledge, and make him/her competitive for residency.

Nationally there has been a move towards the use of Entrustable Professional Activities (EPAs) to ascertain a student's residency preparedness. Below you will find a table of the EPAs PWNNU will be utilizing in the future.

4. Entrustable Professional Activities (EPAs)		
EPAs	Description of Activity	Domains of Competence
EPA 1: Gather a history and perform a physical examination including an osteopathic structural exam as appropriate.	Osteopathic medical students should be able to perform an accurate, complete or focused history and physical exam in a prioritized, organized manner without supervision and with respect for the patient. The history and physical examination should be tailored to the clinical situation and specific patient encounter. This data gathering and patient interaction activity serves as the basis for clinical work and as the building block for patient evaluation and management. Learners need to integrate the scientific foundations of medicine with clinical reasoning skills to guide their information gathering.	<ul style="list-style-type: none"> • Patient Care • Knowledge for Practice • Interpersonal and Communication Skills • Professionalism • Osteopathic Principles and Practice (OPP)
EPA 2: Prioritize a differential diagnosis following a clinical encounter (musculoskeletal considerations that may lead to somatic dysfunction).	To be prepared for the first day of residency, all osteopathic medical students in training need to be able to integrate patient data to formulate an assessment, developing a list of potential diagnoses that can be prioritized and lead to the selection of a working diagnosis. Developing a differential diagnosis is a dynamic and reflective process that requires continuous adaptation to avoid common errors of clinical reasoning such as premature closure.	<ul style="list-style-type: none"> • Patient Care • Knowledge for Practice • Practice-Based Learning and Environment • Interpersonal and Communication Skills • Personal and Professional Development • Osteopathic Principles and Practice (OPP)
EPA 3: Recommend and interpret common diagnostic and screening tests	This EPA describes the essential ability of the day one resident to select and interpret common diagnostic and screening tests* using evidence-based and cost-effective principles as one approaches a patient in any setting	<ul style="list-style-type: none"> • Recommend first-line, cost-effective diagnostic • evaluation for a patient with an acute or chronic common disorder or as part of routine health maintenance. • Provide a rationale for the decision to order the test. • Incorporate cost awareness and principles of cost-effectiveness and pre-

		<p>test/post-test probability in developing diagnostic plans.</p> <ul style="list-style-type: none"> • Interpret the results of basic diagnostic studies (both lab and imaging); know • Common lab values (e.g., electrolytes). • Understand the implications and urgency of an abnormal result and seek assistance for interpretation as needed. • Elicit and consider patient preferences in making recommendations. • Clinical Experiences • Presentations • COMAT
<p>EPA 4: Enter and discuss orders and prescriptions and applicable Osteopathic treatments.</p>	<p>Writing safe and indicated orders is fundamental to a physician’s ability to prescribe therapies or interventions beneficial to patients. It is expected that Osteopathic medical students will be able to do this without direct supervision when they matriculate to residency. Entering students will have a comprehensive understanding of some but not necessarily all of the patient’s clinical problems for which they must provide orders. They must also recognize their limitations and seek review and guidance for any orders and prescriptions they are expected to provide but for which they do not understand the rationale. The expectation is that learners will be able to enter safe orders and prescriptions in a variety of clinical settings (e.g., inpatient, ambulatory, urgent, or emergent care).</p>	<ul style="list-style-type: none"> • Patient Care • Knowledge for Practice • Practice-Based Learning and Environment • Interpersonal and Communication Skills • Professionalism • Osteopathic Principles and Practice (OPP)
<p>EPA 5: Document a clinical encounter in the patient record.</p>	<p>Osteopathic medical students should be able to provide accurate, focused, and context-specific documentation of a clinical encounter in either written or electronic formats. Performance of this EPA is predicated on the ability to obtain information through history, using both primary and secondary sources, and physical exam in a</p>	<ul style="list-style-type: none"> • Patient Care • Interpersonal and Communication Skills • Professionalism • Osteopathic Principles and Practice (OPP)

	variety of settings (e.g., office visit, admission, discharge summary, telephone call, and email).	
EPA 6: Provide an oral presentation of a clinical encounter.	Osteopathic medical students should be able to concisely present a summary of a clinical encounter to one or more members of the health care team (including patients and families) in order to achieve a shared understanding of the patient's current condition. A prerequisite for the ability to provide an oral presentation is synthesis of the information, gathered into an accurate assessment of the patient's current condition.	<ul style="list-style-type: none"> • Practice-Based Learning and Environment • Interpersonal and Communication Skills • Professionalism • Personal and Professional Development
EPA 7: Form clinical questions and retrieve evidence to advance patient care.	It is crucial that students be able to identify key clinical questions in caring for patients, identify information resources, and retrieve information and evidence that will be used to address those questions. Osteopathic medical students should have basic skill in critiquing the quality of the evidence and assessing applicability to their patients and the clinical context. Underlying the skill set of practicing evidence-based medicine is the foundational knowledge an individual has and the self-awareness to identify gaps and fill them.	<ul style="list-style-type: none"> • Knowledge for Practice • Practice-Based Learning and Improvement
EPA 8: Give or receive a patient handover to transition care responsibility.	Effective and efficient handover communication is critical for patient care. Handover communication ensures that patients continue to receive high-quality and safe care through transitions of responsibility from one health care team or practitioner to another. Handovers are also foundational to the success of many other types of interprofessional communication, including discharge from one provider to another and from one setting to another. Handovers may occur between settings (e.g., hospitalist to PCP, pediatric to adult caregiver, discharges to lower-acuity settings) or within settings (e.g., shift changes).	<ul style="list-style-type: none"> • Patient Care • Practice-Based Learning and Environment • Interpersonal and Communication Skills • Professionalism
EPA 9: Collaborate as a member of an interprofessional team.	Effective teamwork is necessary to achieve the Institute of Medicine competencies for care that is safe, timely, effective, efficient, and equitable. Introduction to the roles, responsibilities, and contributions of individual team members early in professional development is critical to fully embracing the value that teamwork adds to patient care outcomes.	<ul style="list-style-type: none"> • Interpersonal and Communication Skills • Professionalism • Systems-Based Practice • Interprofessional Collaboration

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<p>EPA 10: Recognize a patient requiring urgent or emergent care and initiate evaluation and management.</p>	<p>The ability to promptly recognize a patient who requires urgent or emergent care, initiate evaluation and management, and seek help is essential for all physicians. New residents in particular are often among the first responders in an acute care setting, or the first to receive notification of an abnormal lab or deterioration in a patient's status. Early recognition and intervention provide the greatest chance for optimal outcomes in patient care. This EPA often calls for simultaneously recognizing need and initiating a call for assistance.</p>	<ul style="list-style-type: none"> ● Patient Care ● Interpersonal and Communication Skills
<p>EPA 11: Obtain informed consent for procedures/tests (under preceptor supervision).</p>	<p>All physicians must be able to perform patient care interventions that require informed consent. Osteopathic medical students may be in a position to obtain signatures for informed consent for interventions, tests, or procedures they order or perform (e.g., immunizations, central lines, contrast and radiation exposures, blood transfusions, and OMM) after risks and benefits have been explained by the physician caring for the patient.</p>	<ul style="list-style-type: none"> ● Patient Care ● Interpersonal and Communication Skills ● Professionalism ● Systems-Based Practice ● Personal and Professional Development
<p>EPA 12: Perform general procedures of a physician including applicable Osteopathic treatments.</p>	<p>All Osteopathic medical students must demonstrate competency in performing a few core procedures under supervision on completion of medical school in order to provide basic patient care. These procedures include:</p> <ul style="list-style-type: none"> ● Basic cardiopulmonary resuscitation (CPR) ● Bag and mask ventilation ● Venipuncture ● Inserting an intravenous line ● Osteopathic manipulative medicine (OMM) 	<ul style="list-style-type: none"> ● Patient Care ● Interpersonal and Communication Skills ● Professionalism ● Systems-Based Practice ● Personal and Professional Development ● Osteopathic Principles and Practice (OPP)
<p>EPA 13: Identify system failures and contribute to a culture of safety and improvement.</p>	<p>Preventing unnecessary morbidity and mortality requires health professionals to have both an understanding of systems and a commitment to their improvement. This commitment must begin in the earliest stages of health professional education and training. Therefore, this EPA is critical to the professional formation of a physician and forms the foundation for a lifelong commitment to systems thinking and improvement.</p>	<ul style="list-style-type: none"> ● Knowledge for Practice ● Practice-Based Learning and Environment ● Interpersonal and Communication Skills ● Professionalism ● Systems-Based Practice

Prepared by the American Association of Colleges of Osteopathic Medicine, in conjunction with all U.S. Osteopathic Medical Schools. April 2016.

5. Course Learning Objectives (NBOME)		
Course Learning Objectives	Methods of Assessment	Learning Activities
<p>Osteopathic Practice and Principles Candidates must be able to demonstrate knowledge of osteopathic principles and practice, and to demonstrate and apply knowledge of somatic dysfunction diagnosis and Osteopathic Manipulative Treatment in the clinical setting.</p>	Preceptor and Regional Assistant Dean Feedback and Evaluations, Case Logs, Case Presentations, Preceptor Evaluation, COMAT	Clinical Experiences, Didactics, Case Presentations
<p>Patient Care Provide patient-centered care that is culturally responsive, compassionate, and appropriate for the effective treatment of illness and promotion of health.</p> <ol style="list-style-type: none"> 1. Diagnostic management skills <ol style="list-style-type: none"> a. Know how to order appropriate imaging tests <ol style="list-style-type: none"> i. Utilize the ACR (American College of Radiology) Appropriateness Criteria™ ii. Include patient variables into imaging selection b. Understand the importance of providing appropriate information on the radiology request form (history, physical, risk and limiting factors) so radiology can perform appropriate modality selection, protocolling, interpretation and billing 2. Information retrieval skills <ol style="list-style-type: none"> a. Know how to access images and view them <ol style="list-style-type: none"> i. Understand the basics of a picture archiving and communication system (PACS) workstation ii. Understand windows, levels, image linking, etc. b. Know how to access imaging reports: preliminary and final approved reports c. Perform effective, rapid clinical information search 3. Visual interpretative skills <ol style="list-style-type: none"> a. Know basic radiological anatomy b. Understand the factors that affect image appearance and quality c. Understand the importance of using prior comparison studies d. Recognize normal and common or critical abnormal findings on basic radiographic studies including abdominal radiographs, chest radiographs, radiographs of the bones and joints, etc. 	Preceptor and Regional Assistant Dean Feedback and Evaluations, Case Logs, Case Presentations, Preceptor Evaluation, COMAT	Clinical Experiences, Didactics, Case Presentations, View picture archiving and communication system (PACS) Box Teaching

<p>4. Interventional skills</p> <ul style="list-style-type: none"> a. Understand the different types of interventional procedures performed by radiology and the effectiveness of those procedures <ul style="list-style-type: none"> i. Diagnostic procedures e.g. biopsies ii. Therapeutic procedures e.g. embolizations, TIPS b. Understand how to work up a patient for basic interventional procedures e.g. indications and contraindications, alternative treatments, consequences to no treatment. c. Assist in basic interventional procedures e.g. paracentesis with ultrasound guidance (<i>commensurate with skill/readiness</i>) <p>5. Information processing skills</p> <ul style="list-style-type: none"> a. Synthesize history, physical exam and imaging findings to make appropriate differential diagnoses b. Correctly interpret radiology reports <p>6. Patient safety and radiation exposure</p> <ul style="list-style-type: none"> a. Understand the risks of imaging including physical, financial and emotional <ul style="list-style-type: none"> i. Radiation risk (ionizing) to patients and operators and methods to reduce radiation exposure ii. Contrast material risks iii. MRI safety iv. Pregnant patients and imaging <p>7. Interventional procedure risks</p>		
<p>Medical Knowledge Develop a foundation of practical clinical knowledge on rotations while applying basic science knowledge. Develop skill in transitioning from passive to active learning.</p> <p>Elements include an understanding and application of the evolving ethics of human subject research, osteopathic, biomedical, clinical, epidemiological, biomechanical, and cognate (e.g., epidemiological and social-behavioral) sciences in order to optimize patient care.</p> <p>1. Demonstrate sufficient general medical knowledge and apply this knowledge to radiologic studies</p> <ul style="list-style-type: none"> a. Disease processes b. Disease presentations c. Disease progression and prognosis d. Appropriate therapies 	<p>Preceptor and Regional Assistant Dean Feedback and Evaluations, Case Logs, Case Presentations, Preceptor Evaluation, COMAT</p>	<p>Clinical Experiences, Didactics, Case Presentations, View Box (PACS) Teaching</p>

<p>Clinical Skills</p> <ul style="list-style-type: none"> i. Recognize important roles of administrative personnel, nurses and physicians in the delivery of health care that contributes to a student's professional development. Further refine patient history and physical exam, and patient case presentations. 	<p>Preceptor and Regional Assistant Dean Feedback and Evaluations, Case Logs, Case Presentations, Preceptor Evaluation, COMAT</p>	<p>Clinical Experiences, Didactics, Case Presentations</p>
<p>Practice Based Learning and Improvement Demonstrate the ability to continuously evaluate patient care practices, scientific evidence and personal beliefs and biases as they relate to improving the care of patients and optimizing patient outcomes.</p> <ul style="list-style-type: none"> 1. Use of information technology and data resources <ul style="list-style-type: none"> a. Demonstrate awareness of key sources of data for performing evidence-based medicine <ul style="list-style-type: none"> i. Use established medical algorithms (Ottawa ankle rule, Ottawa knee rule, NEXUS criteria for cervical spine imaging) ii. Use National society guidelines for imaging (e.g. Neurology stroke protocol, back pain, first trimester bleeding) b. Use evidence-based methods for selecting imaging modalities <ul style="list-style-type: none"> i. ACR Appropriateness Criteria® c. Effectively search for additional information <ul style="list-style-type: none"> i. Use validated sources such as PubMed (i.e. 'Go Beyond Google™') ii. Know when additional information is needed and search spontaneously 2. Perform critical assessment of the literature <ul style="list-style-type: none"> a. Show an awareness of current literature on common problems b. Research presentation topics appropriately using peer reviewed literature c. Appropriately interpret the results of scientific studies (e.g. Validity of study) d. Be aware of some of the limitations of scientific studies (e.g. Power, sample size, control subjects) 3. Application of learning <ul style="list-style-type: none"> a. Effectively apply newly learned information to appropriate clinical settings <ul style="list-style-type: none"> i. Develop new skills 	<p>Preceptor and Regional Assistant Dean Feedback and Evaluations, Case Logs, Case Presentations, Preceptor Evaluation, COMAT</p>	<p>Clinical Experiences, Didactics, Case Presentations, View Box (PACS) Teaching</p>

<ul style="list-style-type: none"> ii. Apply newly acquired knowledge and skills in the appropriate clinical setting iii. Be able to propose changes in the patient care plan based on the outcomes of imaging studies e. Demonstrate improvement in existing skills and develop new skills 		
<p>Interpersonal and Communication Skills Demonstrate the ability to consistently interact respectfully, empathetically, and professionally with patients, families, allied health care providers, staff and colleagues, to optimize patient and research outcomes.</p> <ul style="list-style-type: none"> 1. Interactions with patients <ul style="list-style-type: none"> a. Interacts effectively with patients <ul style="list-style-type: none"> i. Be compassionate, friendly, professional ii. Be able to take an effective history iii. Can calm anxious patients iv. Be able to develop a potentially therapeutic relationship v. Be able to give appropriate information within their knowledge, ability and level of responsibility 2. Interactions with physicians <ul style="list-style-type: none"> a. With radiologists (staff and residents) <ul style="list-style-type: none"> i. Be respectful, but not inhibited from asking questions ii. Ask appropriate insightful questions that gain knowledge iii. Not be overly intrusive, be aware of time limitations iv. Help with information technology, patient management, communication v. Understand the importance of the radiologist-clinician interaction b. With clinicians <ul style="list-style-type: none"> i. Can gather appropriate clinical information about patients/study requests ii. Can communicate results effectively to clinicians if asked 3. Interactions with technologists/nurses <ul style="list-style-type: none"> a. Exhibit respectful interactions and treat them as a member of the team b. Are aware of the knowledge and training of paramedical staff 	<p>Preceptor and Regional Assistant Dean Feedback and Evaluations, Case Logs, Case Presentations, Preceptor Evaluation, COMAT</p>	<p>Clinical Experiences, Didactics, Case Presentations, View Box (PACS) Teaching</p>

<p>4. Written communication skills</p> <ul style="list-style-type: none"> a. Documents clinical data effectively when needed (e.g. electronic medical record) b. Understands need for recording of urgent findings c. Provides relevant clinical history on requisitions for medical imaging <p>5. Presentation skills</p> <ul style="list-style-type: none"> a. Presents fluent, well-researched presentation b. Shows understanding of topic c. Conveys information succinctly and memorably to audience 		
<p>Professionalism Cultivate professional growth through interactions with all members of the health care organization Exhibit appropriate, professional behavior.</p> <p>1. Demonstrate appropriate skills</p> <ul style="list-style-type: none"> a. Maintains professional and medical competence by continuing to self-learn throughout career b. Seeks help and support when identifies a knowledge gap c. Continually gathers new scientific knowledge d. Strives to improve the quality of patient care by practicing at the highest level of quality <p>2. Demonstrates appropriate behaviors</p> <ul style="list-style-type: none"> a. Meets professional responsibilities by working as a member of a team b. Demonstrates honesty with patients and all members of the health care team c. Respects patient confidentiality with all information transmitted during a patient encounter d. Maintains appropriate relationships with patients to prevent boundary transgression <p>3. Demonstrates social justice and service</p> <ul style="list-style-type: none"> a. Works to improve access to care for those patients with limited resources b. Considers just distribution of finite sources when selecting imaging tests c. Understands issues around conflict of interest 	<p>Preceptor and Regional Assistant Dean Feedback and Evaluations, Case Logs, Case Presentations, Preceptor Evaluation, COMAT</p>	<p>Clinical Experiences, Didactics, Case Presentations, Skills Labs</p>
<p>Knowledge for Practice Develop a foundation of knowledge in anatomy, physiology, pathophysiology, clinical medicine, osteopathic principles related to Primary Care, and clinical research. Students will be expected to apply this knowledge and demonstrate effective diagnostic and therapeutic reasoning skills related to these systems.</p>	<p>Preceptor and Regional Assistant Dean Feedback and Evaluations, Case Logs, Case Presentations, Preceptor Evaluation, COMAT</p>	<p>Clinical Experiences, Didactics, Case Presentations, Skills Labs, View Box (PACS) Teaching</p>

<p>1. Demonstrate radiological knowledge</p> <ul style="list-style-type: none"> a. Understand common radiological modalities <ul style="list-style-type: none"> i. How they are used to generate adequate diagnostic images ii. What affects the image appearance on different modalities (tissue composition) iii. Common radiologic terminology (opacity, echogenicity) iv. Pros and cons of imaging modalities in different clinical situation v. ACR Appropriateness Criteria for Imaging@ common conditions b. Radiological findings in common diseases on typical modalities Accuracy of different modalities in common conditions 		
<p>Systems-Based Practice Effectively utilize available health care system resources to provide optimal health care to the individual patient and local and global communities.</p> <ul style="list-style-type: none"> 1. Demonstrate awareness of the goal of cost-effective imaging <ul style="list-style-type: none"> a. Aware of common examination charges b. Understands the basic concepts of costs and reimbursement c. Understands the financial impact on patients and society of imaging <ul style="list-style-type: none"> i. Understands the importance of performing appropriate imaging ii. Appreciates potential future limitations to imaging availability 2. Understands the workflow patterns in radiology for effective patient management, study ordering etc. 3. Demonstrates effective communication between radiology and clinicians <ul style="list-style-type: none"> a. Appreciates the importance of the radiology-clinician interaction b. Appreciates the importance of prioritizing studies based on study urgency c. Understands the importance of prompt preliminary reports d. Understands the process of dealing with discrepancies between preliminary and final reports 4. Understands the impact of medical radiation exposure on potential cancer risk for population as a whole <ul style="list-style-type: none"> a. Demonstrates knowledge of current data regarding risk 	<p>Preceptor and Regional Assistant Dean Feedback and Evaluations, Case Logs, Case Presentations, Preceptor Evaluation, COMAT</p>	<p>Clinical Experiences, Didactics, Case Presentations, Interprofessional Education (IPE)</p>

5. Aware of need for reducing unnecessary imaging		
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NBOME Fundamental Osteopathic Medical Competencies. June 2016

6. Course Schedule/Calendar

Please refer to the rotation schedule in E*Value. The rotation block is scheduled from Monday of the first day through Sunday of the last day. It is the expectation that the student will be available to assist the preceptor or designee whenever he/she is working. This may include evening and weekend call time as assigned by the preceptor and may be up to 80 hours per week. If the rotation involve shifts the student will be expected to work at least four 10-12 hour shifts including a mixture of days, nights and weekends. The student will inform the Regional Site Administrator (RSA) of their rotation schedule.

7. Course Format

Didactics are conducted throughout your 3rd & 4th years and will be scheduled by the Regional Assistant Dean (RAD). Attendance is **mandatory** when rotating within the region. Exceptional circumstance involving clinical duties that require absence from didactics must be approved by the Regional Assistant Dean before didactics begin. When rotating in another PNWU region, you should participate in that region’s didactics. Please contact the host RSA if there are clinical duties that prevent your attendance. Fourth year students who are rotating at audition rotations are expected to attend that institution’s morning or noon conferences with the residents as agreed to by their preceptor.

8. Course Logistics

Clinical rotations for PNWU are developed in a community training model. Community training involves placing students in a busy physician’s practice, hospital-based experience, or residency program with learning objectives that direct the student’s focus. The student is expected to be self-motivated to read about the cases seen and prepare for upcoming cases. Students should avail themselves of learning opportunities, while taking advantage of clinical cases that present and further augment with reading and modules to complete the objectives. Professionalism means development of lifelong learning patterns and behaviors. The texts and learning resources will provide information necessary for successfully studying in this rotation. Preceptors and residents may direct the student to their favorite texts or online resources.

The Lange Series available on Access Medicine provides medical student level foundational knowledge in Core subjects. Modules for clerkship training are also available on Access Medicine.

Case Logs

The Case Logs or “Must See” cases recorded in Case Logs are the course objectives for this rotation. These objectives will prepare the student with a wide breadth of understanding of the common and life-threatening conditions. The “Must See” cases for this rotation are listed below.

Third year students should focus on developing a basic understanding of the disease processes coupled with further honing of their presentation skills necessary for residency that are encountered during core rotations including:

- Signs, symptoms and physical exam
- Differential diagnosis
- Basic Pathophysiology
- Diagnostic studies needed and their interpretation

- Initial treatment

Fourth year students should focus on a deeper understanding of the disease processes than encountered during core rotations including:

- Comorbidities
- Polypharmacy and Drug interactions
- Diagnostic testing
- Chronic treatment

Logs of the “Must See” cases will be documented in E*Value on Case Logs. Logs may be satisfied by seeing a patient with the condition, completing a reading assignment on the condition, or completing an online module providing the student an understanding of the above concepts. When participating in patient care, the student may wish to briefly state information about a patient for future reference. For example: “38-year-old male with depression” or “42-year-old female, assisted in total abdominal hysterectomy.” If a reading is completed or a module is completed, then briefly comment in the notes section the textbook utilized or the module completed. While each rotation must have at least one objective entered per day on rotation to meet graduation requirements (i.e. 5+ objectives per week), logging the number of encounters actually participated in will better reflect the student’s rotation experience. The logs may be collated in the portfolio to showcase their work for residency interviews. Students should verify completed logs by running a summary report to assure all requirements were met and recorded successfully. ***If a student wishes to be considered for honors, they must be able to verify logs were completed within 7 days by a time stamped report.***

A number of good tutorials and image databases can be found online including:

- [Albert Einstein radiology education site](http://www.learningradiology.com) (www.learningradiology.com)
- Albert Einstein Medical Center Radiology teaching resources and tutorials, cases aimed at medical students and radiology residents-in-training with a very good section for students
- AMSER Shared Resources – These include a 4000+ image dataset of commonly found conditions, lectures and other resources donated by members of the AMSER group of the Association of University Radiologists.
<http://www.dartmouth.edu/~amserimages/> login: amserid password: roentgen

This is a limited list of diagnoses and their respective imaging modalities that all students should see and be able to recognize classic examples of, regardless of their planned specialty. (Images that can be used for teaching this list are available at [AMSER Shared resources](#).)

Must See Cases		
Condition	Details	Modalities
Pneumothorax	Upright, supine, signs of tension	CXR, CT
Pneumonia	Lobar, multifocal, viral	CXR, CT
Pneumomediastinum		CXR, CT
Pneumoperitoneum	Upright, supine	CXR, KUB, CT
Pleural effusion	Upright, supine	CXR, CT
Congestive heart failure	Cardiomegaly, Pulmonary venous hypertension, interstitial, alveolar edema	CXR
Aortic dissection	Type A and type B	CXR, CT
Aortic aneurysm	Ascending, AAA, leak, rupture	CXR, CT

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Diaphragmatic rupture		KUB, CT
SBO (Small bowel obstruction)	Upright, supine	KUB
Cecal and sigmoid volvulus		KUB, enema
Distal large bowel obstruction	Upright, supine	
Ascites	Free fluid, hemoperitoneum	US, CT
Misplaced lines/tubes	Feeding/NG tubes, central venous catheters, endotracheal tubes	CXR, KUB
Child abuse (aka Non-accidental trauma or NAT)	Metaphyseal and rib fractures, bilateral subdurals (inc. isodense)	CXR, extremity films, CT
Stroke	Edema, hemorrhage, mass effect	CT
Intracranial traumatic hemorrhage	Epidural, subdural, subarachnoid, intraparenchymal	CT
Increased intracranial pressure	Midline shift and cerebral herniation, hydrocephalus	CT
Space occupying lesions	Mass effect, edema, +/- contrast	CT, MR
Cervical spine injury	Abnormalities of spinal-laminar lines/alignment of the c-spine e.g. posterior ligamentous injury	Plain films, CT
Fracture with extension into joint	Knees, ankles, wrist, elbow	Plain films
Elbow joint effusion	Radial head fracture, distal humeral fracture	Plain films, child and adult
Shoulder dislocation	Anterior and posterior	Plain films
Buckle fractures	Radius, child	Plain films
Scaphoid fracture		Plain films
Hip fracture	Subcapital, intertrochanteric, subtle	Plain films

Teaching Methods

The following are suggested teaching resources and methods for a student elective in Radiology. These are collated from multiple programs with different resources, program formats and needs, and not all could be applied in any one program.

Group based conferences

- Didactic lectures (i.e., imaging of abdominal pain)
- “Hot seat” case conference (unknown cases)
- Case conferences with review of cases (i.e., tumor board)

Student presentations

- Case based or imaging topic presentation to department or to other students
- Development of case into published case report

One-on-one teaching

- Image viewbox and PACS image observation, especially morning readout (if applicable to department)
- Observation of patient experiences (i.e., patient tracing)
- Longitudinal shadowing of specific technologist, resident or preceptor
- Taking evening call with resident or preceptor if applicable
- Assigned cases for preliminary interpretation

SOAP Notes

Mastery of writing SOAP notes is an important skill for students to learn. Some of the purposes of SOAP notes include to:

- Reflect the evolution of the physician's thinking progress as a case unravels, differential diagnosis is created and a final diagnosis surfaces
- Communicate patient status and progress to others involved in care
- Maintain a record for future reference
- Document care for billing purposes
- Protect from liability
- Follow a verbal presentation format

Various organizations have different institutional policies on who may access the electronic medical records (EMR) which may not provide students the opportunity to write notes in the legal record. When the institution allows access to the EMR, the student is expected to utilize the EMR as directed by their preceptor. Writing a SOAP note is an excellent exercise to organize the information known about a patient, and will assist a student in their clinical presentation and reasoning. The student should be writing notes every day, either in the chart when permitted, or as a separate activity. Students should have their preceptor and/or Regional Assistant Dean review their SOAP notes and elicit feedback on their clinical reasoning.

Students should learn the terminology utilized in the discipline, and the expectations of their preceptor for each SOAP note type. Students should review the core SOAP note modules located on the third-year core clerkship Moodle pages found in the on the Medical Students EHR Documentation Training Module that discusses the documentation of a thorough history and physical. Students should use the focused discipline note for a routine visit and for preparing for COMLEX 2 PE.

Case Presentations

An important clinical skill is communication with other members of the health care team through well-organized case presentations. There are three basic types of case presentations:

- Clinical Rounds/Office Presentation
 - Daily reports of patient progress
 - Briefly recap patient presentation and changes since last visit
 - Takes several minutes and varies by specialty disciplines
- Morning Report
 - Students should be prepared to present their assigned patient's overnight clinical status and labs
 - Students should read about their cases and be able to discuss
 - Review of patient presentation to preceptors, residents, and medical learners
 - If presenting a teaching case – ask questions that stimulate creation of differential diagnoses
 - Be prepared to discuss salient teaching points and latest recommendations
 - Usually takes 10-15 minutes
- Formal Disease Process
 - 30-60 minute presentation that begins with a case
 - More in depth discussion of the disease process and treatment options
 - Usually use a PowerPoint or Prezi
 - Use this format for the recorded presentation graduation requirement

Students should be presenting patients to their preceptor or resident on a daily basis. The structure of these reports should follow the same format as the SOAP notes. Learning to present in a systematic way is an essential skill that develops with experience and shows that the student has learned the basic communication of the health care team. The Regional Assistant Dean will also

be asking students to give case reports to judge their progress. Other members of the team will judge a student’s medical knowledge and progression in clinical reasoning by the student’s skill in giving case presentations.

9. Learning Assessment

Formative Assessments	
Assessment	Pass/Fail
Regional Assistant Dean Reviews	Pass/Fail
Review of Case Logs to ensure 100% completion	
Evaluation of Formal Presentation – Regional Assistant Dean	Pass/Fail
Mid-rotation Preceptor Review (if applicable)	Not graded
Preceptor Evaluation of Student Performance in Core Competencies	Pass/Fail

Summative Assessments	
Assessment	Pass/Fail
Preceptor Evaluation of Student Performance	Pass/Fail
Attendance (any unexcused absence constitutes a fail)	Pass/Fail

Grades for this course are Pass/Fail. All assessments must have a grade of “Pass” to pass a rotation. Any of the summative assessments with a “Fail” will require remediation of the rotation. Students who have not completed the rotation satisfactorily will be referred to Student Progress Committee for determination of remediation.

10. Exam Policy

Third year

Each third year core rotation except Primary Care Core and Emergency Medicine will be evaluated by the COMAT end of service examination which requires a passing grade in order to pass the rotation. This national standardized examination is produced by NBOME to assure all students have met course objectives. If the student is unsuccessful, please see the clinical education department policy on retakes. COMATS are usually proctored by the RSA but the option of taking a COMAT exam at a Prometric Testing Center is an option at the student’s expense. Emergency Medicine COMAT may be taken electively for residency preparation. Please speak to your RSA if you think a testing center option would be good for you.

Fourth year

No end of service examinations are required by PNWU during electives. Students in their fourth year should be preparing for COMLEX 2 CE and PE during their rotations.

11. Course Textbooks & Supplies

Required Textbooks	
Title/ISBN	Author/Publisher/Edition
None. Preceptor may recommend reading materials.	

Suggested Additional Resources	
Title/ISBN	Author/Publisher/Edition
<i>Learning Radiology: Recognizing the Basics</i> ISBN: 9780323567299	William Herring. Elsevier Mosby, 4th Edition. Available on ClinicalKey
<i>Essential Radiology: Clinical Presentation Pathophysiology Imaging</i> ISBN: 9781604065732	Richard B. Gunderman, Thieme, 3rd edition
<i>Squire's Fundamentals of Radiology</i> ISBN: 9780674057951	Robert A. Novelline, Harvard University Press, 7th edition
<i>Radiology Recall</i> ISBN: 9780781765596	Gay Spencer & Richard J. Woodcock, Jr., Lippincott, Williams & Wilkins, 2 nd edition

12. Student Roles and Responsibilities

Links to current Student Catalog and Student Handbook:

<https://www.pnwu.edu/admissions/student-catalog>

<https://www.pnwu.edu/students/student-handbook>

a. Student Professionalism

Professional behavior is expected at all times during this course. It is important that students learn to discuss topics of a sensitive nature in a caring and professional manner. Use of cell phones or texting during class is prohibited. For further clarification of student professionalism expectations, see Student Catalog.

b. Honor Code

The highest standards of academic honesty are required of all PNWU-COM students at all times. It is expected that no PNWU student will be dishonest in any way, or give the impression of dishonest behavior, nor will PNWU students tolerate dishonesty in others. Disciplinary action may occur as a result of failure to comply with these standards.

c. Academic Support

Students in need of peer tutorial assistance are directed to contact Rica Amity, PhD, Learning Skills Specialist (ramity@pnwu.edu). Though the Assessment Department strives to accommodate all tutorial assistance requests, priority will be given to students who demonstrate need based on their academic performance.

The most successful students will practice the following behaviors:

First day

- Share contact information with the preceptor and learn what expectations of communication are.
- Ensure the preceptor has a copy of the PNWU syllabus for the course.
- Ask about the regular schedule, on call expectations and notify the preceptor if there are any excused absence days (i.e. COMLEX exams).
- Find out where personal items may be placed and documentation can be done, as well as policies regarding student access to and documentation on medical records.

- Greet and be courteous to clinic staff. Be careful of joking, off color humor or comments that could be misunderstood.
- Clarify expectations for the use of electronic aids.
- Ask if he/she should pre-round on hospital inpatients and clarify time and place for meeting daily.

Daily

- Be on time and prepared with what is needed.
- Greet and be courteous to clinic staff. Be careful of joking, off color humor or comments that could be misunderstood. Review patients for the next day for topics to read on.
- Read or do modules on patients seen that day for reinforcement of learning.
- Log every day. Two to three cases logged every day will help get through the "must see" cases without last minute cramming.
- Be prepared to assist in any opportunities that present.
- Be enthusiastic. No matter what his/her area of interest is, there are things the student will be exposed to that may not be seen again in his/her career.

Weekly

- Participate in didactics.
- Be prepared with interesting cases he/she has seen throughout the week - help teach classmates.
- Return to his/her clinical responsibilities before/after didactics (this should not be a full day off!).
- Review progress on logs and the growth of his/her understanding.

Mid-Rotation (Optional on Electives but Encouraged)

- The student should request feedback on how he/she is doing. It is the student's responsibility to document the feedback on the mid-rotation feedback form and upload to Portfolio for future reference. Students should make adjustments to performance based on that feedback.

End of Rotation

- The student should ask for a final review of his/her performance during the last week of the rotation. Students should be getting feedback from the preceptor informally daily on performance and areas needing improvement. Supplying the preceptor with a paper copy of the evaluation will help secure completion of the evaluation while the student's performance is fresh in the preceptor's mind. If the student has felt especially positive about the interactions, the student should consider asking the preceptor if he/she would be willing to write a strong letter of recommendation.