DMS-545: INTRODUCTION TO MUSCULOSKELETAL SONOGRAPHY

Effective Term
Fall 2026

BOT Approval Date
12/11/2025

Discipline
DMS - Diagnostic Medical Sonography
Course Number
545

Course Title
Introduction to Musculoskeletal Sonography

Short Title
Intro to MSK Sonography

Credit Status (CB 04)
D - Credit - Degree applicable

Units

Lecture Units
1.00

Lab Units
0.50

Total Units
1.50

Hours

Lecture Contact Hours
16-18
Out of Class Hours Lecture
32-36

Lab Contact Hours
24-27
Out of Class Hours Lab
0.00

Total Contact Hours
40 - 45

Total Out of Class Hours
32 - 36

Total Student Learning Hours
72 - 81

Is this an existing Extensive Lab?
No

Do you want to propose this for Extensive Lab?

No

Distance Education

No

Catalog Description

This course introduces students to the principles and practices of musculoskeletal (MSK) sonography, preparing them to perform entry-level MSK ultrasound examinations. Through a combination of didactic instruction, hands-on laboratory training, and independent clinical practice, students will learn to evaluate joints, muscles, tendons, ligaments, and soft tissue structures using high-resolution sonographic techniques. Emphasis is placed on scanning protocols, patient positioning, image optimization, and correlation with clinical history and physical findings. Students will develop proficiency in identifying normal and pathological MSK anatomy and applying sonographic findings to support diagnostic decision-making.

Requisites

Prerequisite(s)

Prerequisite(s) (must be taken before)
DMS-500 (with a grade of C or better) or Diagnostic Medical Sonography Graduate or Registered Technologist through ARDMS or Registered Technologist through CCI or Registered (sonography) Technologist through ARRT or Medical Doctor Degree

Codes

TOP Code (CB 03)

1227.00* - *Diagnostic Medical Sonography

CIP Code

51.0910 - Diagnostic Medical Sonography/Sonographer and Ultrasound Technician.

Repeatability Code

No

Grading Option

P/NP only

Minimum Qualifications

Minimum Qualifications	And/Or
Diagnostic Medical Technology	End

Learning Objectives

Learning Objectives

Learning Objective
1. Differentiate between appropriate transducers and optimize imaging parameters for superficial musculoskeletal structures.
2. Demonstrate dynamic scanning maneuvers to evaluate joint motion, tendon integrity, and nerve mobility.
3. Document annotation of sonographic images of major musculoskeletal regions, including shoulder, elbow, wrist, hip, knee, and ankle.
4. Correlate between normal and abnormal sonographic appearances of tendinopathy, ligament tears, effusions, and soft tissue masses.
5. Analyze color and power Doppler to assess vascular flow in inflamed or injured musculoskeletal tissues.
6. Formulate a technologist worksheet and image documentation that meet professional and accreditation standards.
7. Demonstrate ethical behavior, effective communication, and cultural sensitivity in simulated patient interactions.

Learning Outcome Information

Course Learning Outcomes

Learning Outcome
1. Students will perform basic musculoskeletal ultrasound examinations using appropriate transducers, scanning techniques, and patient positioning.
2. Students will identify and describe normal sonographic anatomy and differentiate common musculoskeletal pathologies based on exam findings and clinical correlation.
3. Students will apply Doppler imaging techniques to assess vascularity and inflammation in musculoskeletal tissues.
4. Students will document sonographic findings using standardized terminology, proper image annotation, and professional reporting formats.
5. Students will demonstrate culturally competent, patient-centered care by adapting communication, positioning, and scanning practices to meet individual patient needs.

Content

Course Lecture Content

I. Introduction to MSK Sonography
- A. Scope and Applications of MSK Ultrasound
- B. Advantages and Limitations Compared to Other Modalities
- C. Role of the Sonographer in MSK Imaging
- D. CAAHEP Competency Alignment and Clinical Relevance

II. Sonographic Principles for MSK Imaging
- A. Transducer Selection and Frequency Considerations
- B. Patient Positioning and Ergonomics
- C. Image Optimization Techniques
- D. Use of Dynamic Scanning and Real-Time Assessment

III. Normal MSK Anatomy and Sonographic Appearance
- A. Tendons and Ligaments
- B. Muscles and Fascia
- C. Nerves and Neurovascular Bundles
- D. Joints and Synovial Structures
- E. Bone Surfaces and Cortical Landmarks

IV. Upper Extremity Imaging Protocols
- A. Shoulder
  - 1. Rotator Cuff
  - 2. Biceps Tendon
- B. Elbow
  - 1. Common Extensor Tendon
  - 2. Ulnar Nerve
- C. Wrist and Hand
  - 1. Flexor and Extensor Tendons
  - 2. Carpal Tunnel Structures

V. Lower Extremity Imaging Protocols
- A. Hip
  - 1. Iliopsoas and Gluteal Tendons
- B. Knee
  - 1. Quadriceps and Patellar Tendons
  - 2. Joint Effusion and Bursae
- C. Ankle and Foot
  - 1. Achilles Tendon

2. Plantar Fascia and Ligaments

VI. Pathologic Conditions in MSK Ultrasound
- A. Tendinopathy and Tears
- B. Ligament Sprains and Ruptures
- C. Muscle Strains and Hematomas
- D. Joint Effusions and Bursitis
- E. Nerve Entrapment Syndromes
- F. Foreign Bodies and Soft Tissue Masses

VII. Doppler Applications in MSK Imaging
- A. Vascularity in Inflammatory Conditions
- B. Hyperemia in Tendon and Joint Pathology
- C. Differentiating Cystic vs. Solid Lesions

VIII. Documentation and Reporting
- A. Standardized Terminology
- B. Image Annotation and Labeling
- C. Technologist Worksheet Completion
- D. Communicating Findings to Radiologists and Referring Providers

IX. Lab Practicum and Clinical Simulation
- A. Hands-On Scanning with Phantoms and Simulators
- B. Peer-to-Peer Scanning Practice (as appropriate)
- C. Case-Based Image Review and Critique
- D. Integration of Patient History and Physical Exam Findings

X. Professionalism and Patient-Centered Care in MSK Sonography
- A. Cultural Competence and Communication
- B. Ethical Considerations in MSK Imaging
- C. Scope of Practice and Referral Guidelines
- D. Safety and Comfort in Positioning and Scanning

Course Lab Content

I. Lab Orientation and Safety Protocols
- A. Introduction to Lab Equipment and Transducers
- B. Infection Control and Probe Cleaning Procedures
- C. Ergonomics and Sonographer Safety
- D. HIPAA and Professional Conduct in Simulation Labs

II. Image Acquisition Fundamentals
- A. Transducer Handling and Scanning Techniques
- B. Image Optimization: Gain, Depth, Focus, and Frequency
- C. Use of Gel Pads and Standoff Devices
- D. Static vs. Dynamic Imaging Practice

III. Normal Anatomy Scanning Labs
- A. Shoulder
  1. Rotator Cuff Tendons
  2. Biceps Long Head
- B. Elbow
  1. Common Extensor Origin
  2. Ulnar Nerve in Cubital Tunnel
- C. Wrist and Hand
  1. Flexor and Extensor Tendons
  2. Median Nerve in Carpal Tunnel
- D. Knee

1. Quadriceps and Patellar Tendons
2. Joint Effusion and Suprapatellar Bursa

E. Ankle and Foot
1. Achilles Tendon and Retrocalcaneal Bursa
2. Plantar Fascia and Ligaments

IV. Pathology Simulation and Case-Based Scanning
A. Tendon Tears and Tendinopathy Models
B. Ligament Sprains and Joint Effusion Simulations
C. Muscle Strain and Hematoma Identification
D. Nerve Entrapment and Inflammatory Changes
E. Foreign Body Detection and Soft Tissue Masses

V. Doppler Technique Labs
A. Power Doppler for Inflammation
B. Color Doppler for Vascular Mapping
C. Doppler Settings Optimization
D. Interpretation of Vascularity in MSK Pathology

VI. Documentation and Reporting Practice
A. Image Annotation and Labeling
B. Completion of Technologist Worksheets
C. Case Presentation and Peer Review
D. Integration of Clinical History into Lab Reports

VII. Clinical Simulation and Role-Play
A. Patient Interaction and History Gathering
B. Cultural Competence in MSK Scenarios
C. Role-Play: Communicating Findings to Providers
D. Ethical Dilemmas in MSK Imaging

VIII. Competency Assessment and Skill Validation
A. Checklist-Based Scanning Evaluations
B. Peer-to-Peer and Instructor Feedback
C. Objective Structured Clinical Examination (OSCE)
D. LMS-Integrated Rubric Submission and Review

Methods of Instruction

Method
Lecture

Integration
Interactive Lectures

The instructor will use of annotated slides, real-time polling, and embedded sonographic clips to emphasize clinical relevance and promote student engagement.

Method
Lab Activities

Integration
Hands-On Lab Practicum

Instructors will guide students in peer-to-peer scanning each other or using phantom models. This guided instruction will promote structured skill-building aligned with weekly objectives.

Method
In-class Exercises

Integration
Case-Based Learning

The course will integrate real-world clinical scenarios into both lecture and lab instruction to promote applied learning. Students will use these cases to synthesize knowledge of musculoskeletal anatomy, pathology, and sonographic scanning principles. Through guided analysis and hands-on practice, learners will develop clinical reasoning skills by selecting appropriate imaging techniques, optimizing image quality, and interpreting findings to solve diagnostic problems. This approach supports metacognitive engagement and prepares students for professional application in MSK and POCUS environments.

Method
Role Playing/Simulation

Integration
Simulation and Role-Play

This assignment incorporates structured role-play scenarios focused on cultural competence and patient communication. Students will be guided by the instructor to engage in simulated interactions that reflect diverse clinical situations, allowing them to practice respectful dialogue, empathy, and ethical decision-making. These activities reinforce essential soft skills, including active listening, professionalism, and cultural sensitivity, while promoting ethical practice in musculoskeletal sonography and point-of-care imaging. Scenarios will be integrated into lab sessions and may include peer feedback or guided debriefs to support reflective learning

Method
Online Activity/Discussion

Integration
CMS-Integrated Activities

Course content will be delivered and assessed through the CMS, utilizing built-in tools such as quizzes, discussion boards, and assignment submission portals. These activities will support formative and summative assessment while promoting student engagement and accountability. All graded components will use rubric-based evaluation to ensure transparency, consistency, and alignment with course objectives. Feedback loops will be embedded within the CMS to encourage student reflection, support skill development, and reinforce metacognitive learning strategies.

Method
Critique

Integration
Image Review and Critique Sessions

The instructor will include structured group analysis of anonymized musculoskeletal ultrasound scans to reinforce diagnostic reasoning and image evaluation skills. During these sessions, students will collaboratively assess image quality, anatomical accuracy, and clinical relevance. Faculty will guide discussions to highlight optimization techniques, probe positioning, and interpretation strategies. This method promotes peer learning, critical thinking, and alignment with ARDMS MSK registry competencies.

Method
Activity

Integration

The instructor will facilitate weekly formative assessments using game-based quiz platforms to reinforce key concepts in musculoskeletal sonography. These interactive sessions will promote active recall, peer engagement, and real-time feedback on anatomical structures, scanning protocols, and clinical applications. The format supports a low-stakes, high-participation environment that encourages retention, builds confidence, and fosters collaborative learning across diverse student backgrounds.

Methods of Evaluation

Method

Class Work

Integration

Student performance will be assessed through a combination of weekly lab check off lists, written examinations, practical scanning assessments, and case-based image interpretation exercises.

Method

Class Performance

Integration

Competency in musculoskeletal ultrasound techniques will be evaluated using structured skill checklists and direct observation during lab sessions.

Method

Homework

Integration

Students will complete reflective assignments and discussion posts that demonstrate understanding of culturally competent, patient-centered care in MSK imaging.

Method

Homework

Integration

Graded worksheets and image labeling activities will be used to assess anatomical recognition and pathology differentiation

Method

Final Performance

Integration

A final comprehensive assessment will measure mastery of course learning outcomes through integrated clinical scenarios and reporting tasks. Student portfolio or log book (Log all scans & self-reflection)

Method

Class Participation

Integration

Participation in peer review and collaborative learning activities will contribute to the evaluation of professional communication and teamwork skills.

Assignments

Assignment Type
Writing

In-class and/or outside of class
In-class
Outside of class

Formative or Summative
Formative

Assignment
Case-Based Image Interpretation

Watch an AMSSM video and analyze the MSK ultrasound cases for each video:
1. Submit a technologist worksheet with findings, differential diagnoses, measurements, and recommended follow-up.
2. The assignment may include a peer review or discussion board in the CMS.

Assignment Type
Other

In-class and/or outside of class
In-class

Formative or Summative
Formative

Assignment
Role-Play Scenario Reflections

Each student will participate in simulated patient interactions focused on cultural competence and communication. Choose from a scenario list provided by the instructor. This list will be examples of diverse populations which includes: ethnicity, gender, race, socioeconomic, language barriers and/or physical barriers.

Simulate the patient-technologist interaction in campus lab and use the AIDET method of Acknowledge, Introduce, Duration, Explanation (of exam), and Thank you.

Submit short reflection on ethical considerations and patient-centered care

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Assignment Type
Other

In-class and/or outside of class
In-class

Formative or Summative
Formative

Assignment
Doppler Application Mini-Project

Step 1- Capture and annotate doppler images of vascular structures of the radial, ulnar, posterior tibial, and dorsalis pedis arteries.

Submit: a brief report on the technique you used, settings used, and clinical relevance to a patient symptoms.

Assignment Type
Writing

In-class and/or outside of class
Outside of class

Formative or Summative
Summative

Assignment
Final Portfolio Submission

Create a final digital portfolio notebook with a compilation of 5 annotated images for each week of the semester. Include weekly anatomy topics, technologist worksheets, and lab scanning logs.

Submit a final digital portfolio notebook with 16 entries that have 5 images each.

Assignment Type
Reading

In-class and/or outside of class
In-class
Outside of class

Formative or Summative
Formative

Assignment
Shoulder Ultrasound
1-Hour Lecture Session
Objectives
- Understand shoulder anatomy and ultrasound scanning technique.
- Recognize normal structures and common shoulder pathologies.
Outline (Referenced from Chapter “Shoulder Ultrasound” in Fundamentals of Musculoskeletal Ultrasound, 3rd Edition, pp. 101–146)
1. Anatomy & Technique
- Review scan protocol: patient seated with arm in neutral or modified Crass position; high-frequency linear probe.
- Identify key structures:
* Rotator cuff tendons: supraspinatus, infraspinatus, teres minor, subscapularis.
* Long head of biceps tendon.
* Subacromial-subdeltoid bursa.
* Acromioclavicular (AC) joint.
* Sternoclavicular joint.
2. Pathology & Pitfalls
- Common pathologies: rotator cuff tears, biceps tendinopathy, bursitis, AC joint arthritis, labral cysts.
- Pitfalls: anisotropy in tendon imaging, incomplete visualization of subscapularis tendon.
3. Normal vs. Abnormal Imaging
- Tendons: fibrillar echotexture, hyperechoic; partial/complete tear = hypoechoic or anechoic defect.
- Bursa: normally thin and hypoechoic; thickened and fluid-filled in bursitis.
- Joints: smooth cortical margins; osteophytes and irregularity in arthritis.
4. Practical Tips & Limitations
- Use dynamic maneuvers for impingement testing.
- Avoid excessive probe pressure over superficial tendons.
- Recognize ultrasound limits for labral pathology.

2-Hour Hands-On Application — Shoulder Exam Checklist

Use the following checklist based on the standard scan areas outlined in the book's Shoulder chapter (pp. 57–125). Students should perform each step while referencing the text and figures.
Step: Structure / Task
1. Position patient seated; scan long head of biceps tendon in long/short axis within bicipital groove
Shoulder Chapter, pp. 58-60

2. Assess for biceps tendon subluxation dynamically with external/internal rotation
Shoulder Chapter, p. 58-61

3. Scan subscapularis tendon in long/short axis with arm in external rotation
Shoulder Chapter, pp. 61

4. Scan supraspinatus tendon in modified Crass position (long/short axis)
Shoulder Chapter, pp. 62-65

5. Assess subacromial-subdeltoid bursa overlying supraspinatus
Shoulder Chapter, pp. 69-70

6. Scan infraspinatus and teres minor tendons in long/short axis
Shoulder Chapter, pp. 71-74

7. Assess posterior labrum and posterior joint recess
Shoulder Chapter, pp. 68-69

8. Scan AC joint for joint space narrowing, osteophytes
Shoulder Chapter, pp. 68-69

9. Document images for all major structures
Shoulder Chapter, p. 5

Assignment Type

Reading

In-class and/or outside of class

In-class
Outside of class

Formative or Summative

Formative

Assignment

Shoulder Ultrasound Part 2 (Advanced and Dynamic Assessment)
1-Hour Lecture Session
Objectives
- Perform advanced ultrasound assessment of the shoulder, including dynamic testing.
- Recognize subtle pathologies and advanced procedural anatomy.
Outline (Referenced from Chapter "Shoulder Ultrasound" in Fundamentals of Musculoskeletal Ultrasound, 3rd Edition, pp. 55–126)
1. Anatomy & Technique (Advanced)
- Advanced views of rotator cuff tendons and pericapsular structures.
- Dynamic scanning techniques for impingement and instability.
- Evaluation of labral cysts and subtle bursitis.
2. Pathology & Pitfalls
- Subtle partial-thickness cuff tears.
- Dynamic impingement under active abduction.
- Pitfalls: anisotropy masking small tears, difficulty differentiating bursal fluid from joint recess fluid.
3. Normal vs. Abnormal Imaging
- Comparison with contralateral side for subtle abnormalities.
- Tendon thinning vs. thickening in chronic vs. acute injury.
- Real-time assessment of tendon subluxation or instability.

4. Practical Tips & Limitations
- Always use dynamic maneuvers in suspected impingement.
- Consider patient discomfort during abduction testing.
- Recognize limits for labral visualization.

2-Hour Hands-On Application — Shoulder Part 2 Exam Checklist
Use the following checklist based on advanced scanning steps outlined in the book's Shoulder chapter (pp. 127–146). Students should perform each step while referencing the text and figures.
Step
Structure / Task
Reference
1. Perform dynamic abduction with probe over supraspinatus to assess for impingement
Shoulder Chapter, pp. 62-67
2. Assess dynamic stability of biceps tendon during internal/external rotation
Shoulder Chapter, pp. 58-60
3. Evaluate for partial-thickness tears using oblique probe angles
Shoulder Chapter, p. 75-85
4. Use Doppler to assess hyperemia in suspected tendinopathy or bursitis
Shoulder Chapter, p. 85-88
5. Scan posterior labrum with patient in modified Crass position
Shoulder Chapter, pp. 133–134
6. Assess glenohumeral joint recesses for effusion
Shoulder Chapter, pp. 134–135
7. Evaluate AC joint dynamically during cross-body adduction
Shoulder Chapter, p. 136
8. Optional: assess sternoclavicular joint during arm elevation
Shoulder Chapter, p. 137
9. Document advanced dynamic images and compare bilaterally
Shoulder Chapter, pp. 138–139
10. Prepare for potential procedural guidance views (subacromial bursa, biceps sheath)
Shoulder Chapter, p. 140

Assignment Type

Reading

In-class and/or outside of class

In-class
Outside of class

Formative or Summative

Formative

Assignment

Elbow Ultrasound
1-Hour Lecture Session
Objectives
- Understand elbow anatomy and ultrasound scanning technique.
- Recognize normal structures and common pathologies.
Outline (Referenced from Chapter "Elbow Ultrasound" in Fundamentals of Musculoskeletal Ultrasound, 3rd Edition, pp. 203–230)
1. Anatomy & Technique
- Review scan protocol: patient positioning (elbow flexed 90°, forearm in pronation/supination depending on compartment), sonographer positioning, and transducer handling.
- Identify key structures:
* Anterior compartment: Biceps tendon, brachialis, brachial artery, median nerve.
* Lateral compartment: Common extensor tendon, radial head, lateral collateral ligament.
* Medial compartment: Common flexor tendon, ulnar collateral ligament, ulnar nerve in cubital tunnel.
* Posterior compartment: Triceps tendon insertion, olecranon fossa, posterior joint recess.
2. Pathology & Pitfalls
- Common pathologies: lateral epicondylitis, medial epicondylitis, distal biceps tendon tear, triceps tendon tear, ulnar neuritis, bursitis.

- Pitfalls: anisotropy in tendon imaging, difficulty visualizing deep ligament structures, probe pressure altering nerve appearance.

3. Normal vs. Abnormal Imaging
- Tendon echotexture in long/short axis.
- Detection of tendon thickening, hypoechoic regions, partial/complete tears.
- Doppler use to identify hyperemia in tendinopathy.
4. Practical Tips & Limitations
- Avoid excessive probe pressure when imaging superficial nerves.
- Use dynamic maneuvers to assess subluxation (e.g., ulnar nerve, snapping triceps).
- Understand the limits of US in visualizing deep joint pathology.

2-Hour Hands-On Application — Elbow Exam Checklist
Use the following checklist based on the standard scan areas outlined in the book's Elbow chapter (pp. 203–230). Students should perform each step while referencing the text and figures.
Step
Structure / Task
Reference
1. Position patient seated with elbow flexed 90°, forearm resting on table; align transducer appropriately for anterior compartment
Elbow Chapter, p. 205
2. Scan distal biceps tendon (long and short axis), evaluate for echotexture, tears
Elbow Chapter, pp. 205–207
3. Identify brachial artery and median nerve in cubital fossa
Elbow Chapter, pp. 207–208
4. Scan lateral compartment: common extensor tendon origin at lateral epicondyle, radial head
Elbow Chapter, pp. 208–211
5. Evaluate lateral collateral ligament complex in long/short axis
Elbow Chapter, p. 211
6. Scan medial compartment: common flexor tendon at medial epicondyle
Elbow Chapter, pp. 212–214
7. Identify ulnar collateral ligament and assess for thickening/tears
Elbow Chapter, p. 214
8. Visualize ulnar nerve within cubital tunnel; assess for subluxation dynamically
Elbow Chapter, pp. 214–216
9. Scan posterior compartment: triceps tendon insertion on olecranon
Elbow Chapter, pp. 217–218
10. Assess posterior joint recess for effusion or synovitis
Elbow Chapter, p. 219
11. Optional dynamic studies: valgus/varus stress for ligament assessment, resisted extension for tendon pathology
Elbow Chapter, pp. 219–220

Assignment Type

Reading

In-class and/or outside of class

In-class
Outside of class

Formative or Summative

Formative

Assignment

Wrist Ultrasound
1-Hour Lecture Session
Objectives
- Understand wrist anatomy and ultrasound scanning technique.
- Recognize normal structures and common pathologies.
Outline (Referenced from Chapter "Wrist and Hand Ultrasound" in Fundamentals of Musculoskeletal Ultrasound, 3rd Edition, pp. 231–262)
1. Anatomy & Technique
- Review scan protocol: patient seated with forearm supported, wrist in neutral or slight extension depending on compartment; sonographer at side or in front.
- Identify key structures:

* Volar wrist: Flexor carpi radialis tendon, palmaris longus, flexor digitorum superficialis/profundus tendons, flexor pollicis longus tendon, median nerve at carpal tunnel.
* Dorsal wrist: Extensor compartments 1–6 with respective tendons.
* Ulnar side: Extensor carpi ulnaris tendon, triangular fibrocartilage complex (TFCC).
* Radial side: Abductor pollicis longus and extensor pollicis brevis tendons.
2. Pathology & Pitfalls
- Common pathologies: tenosynovitis (e.g., De Quervain's), ganglion cysts, TFCC tears, median nerve entrapment (carpal tunnel syndrome).
- Pitfalls: anisotropy in small tendons, over compression altering nerve cross-sectional area, difficulty visualizing TFCC completely.
3. Normal vs. Abnormal Imaging
- Tendon echotexture in long/short axis.
- Identification of nerve swelling or flattening in entrapment syndromes.
- Hypoechoic regions in tears, fluid in tendon sheath for tenosynovitis.
4. Practical Tips & Limitations
- Use high-frequency linear transducer for optimal resolution.
- Use Doppler to assess for hyperemia in inflammatory conditions.
- Recognize that certain ligament/cartilage structures (e.g., TFCC) may be incompletely visualized.

2-Hour Hands-On Application — Wrist Exam Checklist
Use the following checklist based on the standard scan areas outlined in the book's Wrist and Hand chapter (pp. 231–262). Students should perform each step while referencing the text and figures.
Step
Structure / Task
Reference
1. Position patient with forearm supported, wrist in neutral or slight extension; align transducer for volar wrist imaging
Wrist/Hand Chapter, p. 233
2. Identify and scan flexor carpi radialis tendon and palmaris longus
Wrist/Hand Chapter, pp. 233–234
3. Evaluate flexor digitorum superficialis/profundus tendons in carpal tunnel
Wrist/Hand Chapter, pp. 234–235
4. Scan flexor pollicis longus tendon in carpal tunnel
Wrist/Hand Chapter, p. 235
5. Identify median nerve at carpal tunnel, measure cross-sectional area
Wrist/Hand Chapter, pp. 235–237
6. Rotate to dorsal wrist; scan extensor compartments 1–3 over distal radius
Wrist/Hand Chapter, pp. 238–241
7. Scan extensor compartments 4–6 over dorsal ulna
Wrist/Hand Chapter, pp. 241–243
8. Visualize ulnar side: ECU tendon and TFCC region
Wrist/Hand Chapter, pp. 243–245
9. Assess radial side: APL and EPB tendons for De Quervain's
Wrist/Hand Chapter, pp. 246–247
10. Use Doppler to assess for hyperemia in suspected tendinopathy
Wrist/Hand Chapter, p. 248
11. Optional dynamic imaging: tendon subluxation during wrist motion
Wrist/Hand Chapter, p. 249

Assignment Type

Reading

In-class and/or outside of class

In-class
Outside of class

Formative or Summative

Formative

Assignment

Hand Ultrasound
1-Hour Lecture Session
Objectives

- Understand hand and finger tendon, nerve, and joint anatomy relevant to ultrasound.
- Recognize normal imaging appearance and common pathologies of the hand.
Outline (Referenced from Chapter “Wrist and Hand Ultrasound” in Fundamentals of Musculoskeletal Ultrasound, 3rd Edition, pp. 231–262)
1. Anatomy & Technique
- Review scan protocol: patient seated with hand resting palm-up or palm-down on examination table; use high-frequency linear transducer.
- Identify key structures:
* Flexor tendons within digits and palm.
* Extensor tendons over dorsum of hand and digits.
* Pulley system (A1–A5).
* Digital nerves and arteries.
* MCP, PIP, and DIP joints.
2. Pathology & Pitfalls
- Common pathologies: trigger finger (stenosing tenosynovitis), tendon tears, synovitis, rheumatoid nodules, foreign bodies.
- Pitfalls: anisotropy in tendon imaging, difficulty in small structure resolution without optimal probe positioning.
3. Normal vs. Abnormal Imaging
- Flexor and extensor tendon fibrillar echotexture in long and short axis.
- Hypoechoic thickening in tenosynovitis.
- Joint effusion and synovial hypertrophy in arthritis.
- Echogenic foreign body with posterior shadowing.
4. Practical Tips & Limitations
- Use generous gel or standoff pad for superficial structures.
- Dynamic scanning during finger flexion/extension to assess tendon gliding.
- Recognize limits in visualizing deep small joint cartilage.

2-Hour Hands-On Application — Hand Exam Checklist
Use the following checklist based on the standard scan areas outlined in the book’s Wrist and Hand chapter (pp. 231–262). Students should perform each step while referencing the text and figures.
Step
Structure / Task
Reference
1. Position patient with hand supported, palm up for flexor tendon scanning
Book Wrist/Hand Chapter, p. 250
2. Scan flexor tendons in long axis from palm to fingertip
Book Wrist/Hand Chapter, pp. 250–251
3. Scan flexor tendons in short axis, noting pulley locations (A1–A5)
Book Wrist/Hand Chapter, p. 251
4. Perform dynamic flexion to assess tendon gliding and pulley movement
Book Wrist/Hand Chapter, p. 251
5. Position hand palm-down for extensor tendon scanning over dorsum
Book Wrist/Hand Chapter, p. 252
6. Scan extensor tendons in long and short axis along metacarpals and phalanges
Book Wrist/Hand Chapter, pp. 252–253
7. Evaluate MCP, PIP, and DIP joints for effusion, synovitis, erosions
Book Wrist/Hand Chapter, p. 254
8. Identify digital nerves and arteries along lateral aspects of each finger
Book Wrist/Hand Chapter, p. 255
9. Assess for masses or foreign bodies within soft tissue
Book Wrist/Hand Chapter, p. 256
10. Optional: use Doppler to assess for hyperemia in inflammatory conditions
Book Wrist/Hand Chapter, p. 257

Assignment Type

Other

In-class and/or outside of class

In-class
Outside of class

Formative or Summative

Formative

Assignment

Hip Ultrasound
1-Hour Lecture Session
Objectives
- Understand anterior, lateral, and posterior hip anatomy relevant to ultrasound.
- Recognize normal structures and common hip pathologies.
Outline (Referenced from Chapter “Hip Ultrasound” in Fundamentals of Musculoskeletal Ultrasound, 3rd Edition, pp. 263–284)
1. Anatomy & Technique
- Review scan protocol: patient supine for anterior and lateral hip views, prone for posterior views; high-frequency linear probe for superficial structures, curvilinear probe for deep joint structures.
- Identify key structures:
* Anterior: Femoral head and neck, anterior joint recess, iliopsoas tendon and bursa.
* Lateral: Greater trochanter, gluteus medius and minimus tendons, trochanteric bursa.
* Posterior: Ischial tuberosity, hamstring origin, sciatic nerve.
2. Pathology & Pitfalls
- Common pathologies: hip joint effusion, iliopsoas bursitis, gluteus medius/minimus tendinopathy, trochanteric bursitis, hamstring tendinopathy.
- Pitfalls: deep location limits resolution, anisotropy in tendon imaging, overlying soft tissue obscuring structures.
3. Normal vs. Abnormal Imaging
- Hypoechoic joint recess fluid in effusion.
- Tendon thickening, hypoechoic changes, partial or complete tears.
- Hypoechoic or complex fluid in bursitis.
4. Practical Tips & Limitations
- Use curvilinear transducer for deep structures.
- Apply minimal pressure to avoid compressing fluid collections.
- Dynamic hip rotation can aid in identifying femoral head and neck.

2-Hour Hands-On Application — Hip Exam Checklist
Use the following checklist based on the standard scan areas outlined in the book’s Hip chapter (pp. 263–284). Students should perform each step while referencing the text and figures.
Step
Structure / Task
Reference
1. Position patient supine; place probe longitudinally over anterior hip to visualize femoral head, neck, and acetabulum
Book Hip Chapter, p. 265
2. Identify anterior joint recess and assess for effusion
Book Hip Chapter, pp. 265–267
3. Visualize iliopsoas tendon and bursa in long and short axis
Book Hip Chapter, pp. 267–269
4. Assess dynamic snapping of iliopsoas tendon during hip flexion/extension
Book Hip Chapter, p. 269
5. Position patient lateral decubitus; scan greater trochanter and gluteus medius tendon in long/short axis
Book Hip Chapter, pp. 270–272
6. Evaluate gluteus minimus tendon and trochanteric bursa
Book Hip Chapter, pp. 272–273
7. Use Doppler to detect hyperemia in suspected bursitis or tendinopathy
Book Hip Chapter, p. 273
8. Position patient prone; scan ischial tuberosity and hamstring origin
Book Hip Chapter, pp. 274–275
9. Identify sciatic nerve in posterior hip region
Book Hip Chapter, p. 276
10. Optional: assess dynamic motion during hip rotation for tendon subluxation
Book Hip Chapter, p. 277

Assignment Type

Reading

In-class and/or outside of class

In-class
Outside of class

Formative or Summative

Formative

Assignment

Thigh Ultrasound
1-Hour Lecture Session
Objectives
- Understand anterior, posterior, and medial thigh muscle anatomy relevant to ultrasound.
- Recognize normal musculotendinous structures and common thigh pathologies.
Outline (Referenced from Chapter "Thigh Ultrasound" in Fundamentals of Musculoskeletal Ultrasound, 3rd Edition, pp. 285–300)
1. Anatomy & Technique
- Review scan protocol: patient supine for anterior thigh, prone for posterior thigh, and supine with leg abducted for medial thigh.
- Identify key structures:
* Anterior: Quadriceps muscle group (rectus femoris, vastus medialis, vastus lateralis, vastus intermedius).
* Posterior: Hamstring muscle group (biceps femoris, semitendinosus, semimembranosus).
* Medial: Adductor longus, adductor brevis, adductor magnus, gracilis.
2. Pathology & Pitfalls
- Common pathologies: muscle strains/tears, hematomas, myositis ossificans.
- Pitfalls: anisotropy in tendon imaging, incomplete visualization of deep muscle borders.
3. Normal vs. Abnormal Imaging
- Muscle echotexture: hypoechoic muscle fibers with echogenic perimysial septa.
- Disruption of normal architecture in muscle tears.
- Hypoechoic or complex collections in hematoma.
4. Practical Tips & Limitations
- Use standoff or abundant gel for superficial structures.
- Dynamic contraction to assess muscle fiber integrity.
- Compare to contralateral side for subtle injuries

2-Hour Hands-On Application — Thigh Exam Checklist
Use the following checklist based on the standard scan areas outlined in the book's Thigh chapter (pp. 285–300). Students should perform each step while referencing the text and figures.
Step
Structure / Task
Reference
1. Position patient supine; scan rectus femoris from origin at AIIS to quadriceps tendon insertion
Thigh Chapter, pp. 287–288
2. Scan vastus medialis in long/short axis
Thigh Chapter, p. 288
3. Scan vastus lateralis in long/short axis
Thigh Chapter, p. 289
4. Assess vastus intermedius deep to rectus femoris
Thigh Chapter, p. 290
5. Position patient prone; scan biceps femoris from ischial tuberosity to knee insertion
Thigh Chapter, p. 291
6. Scan semitendinosus and semimembranosus from origin to insertion
Thigh Chapter, p. 292
7. Position patient supine with leg abducted; scan adductor longus
Thigh Chapter, p. 293
8. Scan adductor brevis and adductor magnus in long/short axis
Thigh Chapter, pp. 294–295
9. Identify gracilis muscle along medial thigh
Thigh Chapter, p. 295
10. Perform dynamic contraction of quadriceps and hamstrings to assess fiber continuity
Thigh Chapter, p. 296
11. Optional: assess for hematoma or fluid collection using compression and Doppler
Thigh Chapter, pp. 297–298

Assignment Type

Reading

In-class and/or outside of class

In-class
Outside of class

Formative or Summative

Formative

Assignment

Knee Ultrasound
1-Hour Lecture Session
Objectives
- Understand anterior, medial, lateral, and posterior knee anatomy relevant to ultrasound.
- Recognize normal knee structures and common pathologies.
Outline (Referenced from Chapter “Knee Ultrasound” in Fundamentals of Musculoskeletal Ultrasound, 3rd Edition, pp. 315–344)
1. Anatomy & Technique
- Review scan protocol: patient supine for anterior, medial, and lateral compartments; prone for posterior knee.
- Identify key structures:
* Anterior: Quadriceps tendon, patella, patellar tendon, anterior joint recess.
* Medial: Medial collateral ligament (MCL), medial meniscus.
* Lateral: Lateral collateral ligament (LCL), lateral meniscus, iliotibial (IT) band.
* Posterior: Baker's cyst, popliteal artery and vein, gastrocnemius-semimembranosus bursa.
2. Pathology & Pitfalls
- Common pathologies: tendon tears, ligament sprains, meniscal extrusion, joint effusion, Baker’s cyst.
- Pitfalls: anisotropy in tendons/ligaments, difficulty differentiating small meniscal tears.
3. Normal vs. Abnormal Imaging
- Tendon echotexture in long/short axis.
- Ligament fibrillar pattern, joint recess fluid, hypoechoic or anechoic cystic lesions.
- Meniscus wedge-shaped echogenic fibrocartilage; extrusion or disruption in tears.
4. Practical Tips & Limitations
- Use dynamic stress to assess ligament integrity.
- Compare to contralateral knee for subtle abnormalities.
- Recognize that MRI is superior for intra-articular pathology.

2-Hour Hands-On Application — Knee Exam Checklist
Use the following checklist based on the standard scan areas outlined in the book’s Knee chapter (pp. 315–344). Students should perform each step while referencing the text and figures.
Step
Structure / Task
Reference
1
Position patient supine; scan quadriceps tendon in long and short axis
Knee Chapter, pp. 317–318
2
Scan patella and patellar tendon in long and short axis
Knee Chapter, pp. 319–320
3
Evaluate anterior joint recess for effusion or synovitis
Knee Chapter, p. 321
4
Scan medial compartment: MCL in long/short axis
Knee Chapter, pp. 322–323
5
Assess medial meniscus for extrusion or tears
Knee Chapter, pp. 323–324
6
Scan lateral compartment: LCL in long/short axis
Knee Chapter, pp. 325–326
7
Assess lateral meniscus for extrusion or tears

Knee Chapter, pp. 326–327
8
Evaluate IT band insertion on Gerdy's tubercle
Knee Chapter, p. 328
9
Position patient prone; assess Baker's cyst in popliteal fossa
Knee Chapter, pp. 329–331
10
Identify popliteal artery and vein with Doppler
Knee Chapter, p. 331
11
Optional: dynamic valgus/varus stress for MCL/LCL assessment
Knee Chapter, pp. 332–333

Assignment Type

Reading

In-class and/or outside of class

In-class
Outside of class

Formative or Summative

Formative

Assignment

Knee Ultrasound Part 2 (Dynamic and Pathology-Focused)
1-Hour Lecture Session
Objectives
- Understand dynamic maneuvers for knee ligament assessment using ultrasound.
- Recognize pathological findings in tendons, ligaments, menisci, and synovium.
Outline (Referenced from Chapter "Knee Ultrasound" in Fundamentals of Musculoskeletal Ultrasound, 3rd Edition, pp. 315–344)
1. Anatomy & Technique for Dynamic Scanning
- Use patient positioning from Week 10, adding valgus and varus stress for medial and lateral ligament testing.
- Dynamic scanning for patellar tracking, quadriceps and patellar tendon stress testing.
2. Pathology & Pitfalls
- Common pathologies: patellar tendinopathy (jumper's knee), partial/complete ligament tears, synovitis in inflammatory arthritis, meniscal extrusion.
- Pitfalls: excessive probe pressure masking small effusions, anisotropy in ligament fibers.
3. Normal vs. Abnormal Imaging
- Patellar tendon: thickening, hypoechoic changes, neovascularization.
- Ligaments: discontinuity in fiber pattern for complete tears.
- Synovium: hypoechoic thickening with Doppler hyperemia in inflammation.
4. Practical Tips & Limitations
- Compare stressed vs. unstressed ligament appearance.
- Use power Doppler for subtle synovial hyperemia.
- Recognize MRI as adjunct for meniscal and deep ligament tears.

2-Hour Hands-On Application — Knee Dynamic & Pathology Checklist
Use the following checklist based on the dynamic and pathology-focused scanning outlined in the textbook's Knee chapter (pp. 315–344). Students should perform each step while referencing the text and figures.
Step
Structure / Task
Reference
1. Perform valgus stress with probe over MCL to assess fiber continuity and gapping
Knee Chapter, pp. 332–333
2. Perform varus stress with probe over LCL to assess fiber continuity and gapping
Knee Chapter, pp. 333–334
3. Dynamic patellar tracking during active and passive knee flexion/extension
Knee Chapter, p. 334
4. Assess quadriceps tendon under resisted extension for focal hypoechoic changes

Knee Chapter, p. 335
5. Assess patellar tendon under resisted extension for thickening and neovascularity with Doppler
Knee Chapter, pp. 336–337
6. Evaluate meniscus during dynamic flexion/extension for extrusion
Knee Chapter, pp. 337–338
7. Scan suprapatellar recess for synovitis; use Doppler to assess hyperemia
Knee Chapter, p. 339
8. Compare findings to contralateral side for symmetry
Knee Chapter, p. 340
9. Optional: assess post-surgical changes (e.g., ACL reconstruction graft visualization)
Knee Chapter, p. 341

Assignment Type

Other

In-class and/or outside of class

In-class

Formative or Summative

Formative

Assignment

Ankle, Foot, and Lower Leg Ultrasound
1-Hour Lecture Session
Objectives
- Understand medial, lateral, anterior, and posterior ankle compartments and plantar foot anatomy relevant to ultrasound.
- Recognize normal and abnormal findings in tendons, ligaments, fascia, and neurovascular structures.
Outline (Referenced from Chapter “Ankle and Foot Ultrasound” in Fundamentals of Musculoskeletal Ultrasound, 3rd Edition, pp. 345–376)
1. Anatomy & Technique
- Patient positioning: seated or supine with foot supported; prone for posterior ankle; use high-frequency linear probe.
- Identify key structures:
* Medial: Tibialis posterior tendon, flexor digitorum longus (FDL), flexor hallucis longus (FHL), posterior tibial artery and nerve.
* Lateral: Peroneus longus and brevis tendons.
* Anterior: Tibialis anterior tendon, extensor digitorum longus (EDL), extensor hallucis longus (EHL), anterior tibial artery.
* Posterior: Achilles tendon, retrocalcaneal bursa.
* Plantar foot: Plantar fascia, flexor tendons, metatarsal heads.
2. Pathology & Pitfalls
- Common pathologies: tendinopathy, tendon tears, ligament sprains, plantar fasciitis, retrocalcaneal bursitis.
- Pitfalls: anisotropy in tendon imaging, compression artifact on nerves.
3. Normal vs. Abnormal Imaging
- Tendons: fibrillar echotexture in long/short axis.
- Fascia: hyperechoic linear structure; thickening and hypoechoic change in plantar fasciitis.
- Bursae: anechoic or complex fluid in bursitis.
4. Practical Tips & Limitations
- Use Doppler for hyperemia in inflammatory conditions.
- Dynamic maneuvers to assess tendon subluxation.
- Recognize MRI is superior for deep intraosseous pathology.

2-Hour Hands-On Application — Ankle, Foot, and Lower Leg Exam Checklist
Use the following checklist based on the standard scan areas outlined in the book’s Ankle and Foot chapter (pp. 345–376). Students should perform each step while referencing the text and figures.
Step
Structure / Task
Reference
1. Position patient supine; scan medial ankle: tibialis posterior tendon in long/short axis
Ankle/Foot Chapter, pp. 347–348
2. Identify flexor digitorum longus and flexor hallucis longus tendons
Ankle/Foot Chapter, pp. 348–349
3. Locate posterior tibial artery and tibial nerve; assess for compression

Ankle/Foot Chapter, p. 350
4. Rotate to lateral ankle: peroneus longus and brevis tendons
Ankle/Foot Chapter, pp. 351–353
5. Perform dynamic eversion to assess for peroneal tendon subluxation
Ankle/Foot Chapter, p. 353
6. Scan anterior ankle: tibialis anterior, EDL, EHL tendons
Ankle/Foot Chapter, pp. 354–355
7. Identify anterior tibial artery and deep peroneal nerve
Ankle/Foot Chapter, p. 356
8. Position patient prone; scan Achilles tendon insertion on calcaneus
Ankle/Foot Chapter, pp. 357–358
9. Assess retrocalcaneal bursa for fluid or thickening
Ankle/Foot Chapter, p. 359
10. Scan plantar fascia from calcaneal origin distally
Ankle/Foot Chapter, pp. 360–361
11. Optional: assess metatarsal heads for Morton's neuroma
Ankle/Foot Chapter, pp. 362–363

Assignment Type

Reading

In-class and/or outside of class

In-class
Outside of class

Formative or Summative

Formative

Assignment

Procedures (Shoulder) Ultrasound-Guided Injections
1-Hour Lecture Session
Objectives
- Understand ultrasound-guided injection techniques for common shoulder procedures.
- Recognize normal sonoanatomy relevant to procedural guidance and avoid critical structures.
Outline (Referenced from Chapter "Interventional Ultrasound: Shoulder" in Fundamentals of Musculoskeletal Ultrasound, 3rd Edition, pp. 377–396)
1. Anatomy & Technique
- Review relevant sonoanatomy for procedures:
* Glenohumeral joint.
* Subacromial-subdeltoid bursa.
* Long head of biceps tendon sheath.
- Discuss in-plane and out-of-plane approaches.
- Review sterile preparation and needle visualization techniques.
2. Pathology & Indications
- Common indications: bursitis, adhesive capsulitis, arthritis, rotator cuff tears with impingement.
- Pitfalls: poor needle visualization due to anisotropy, inadvertent injection into tendon fibers.
3. Injection Techniques
- Glenohumeral joint injection: posterior or anterior approach.
- Subacromial-subdeltoid bursa injection.
- Biceps tendon sheath injection.
4. Practical Tips & Limitations
- Always confirm needle tip location before injection.
- Use Doppler to avoid vascular structures.
- Avoid injecting through infected or compromised skin.

2-Hour Hands-On Application — Shoulder Procedure Checklist
Use the following checklist based on the procedural guidance outlined in the book's Interventional Ultrasound: Shoulder chapter (pp. 377–396). Students should perform each step while referencing the text and figures.
Step
Structure / Task

Reference
1. Prepare sterile field and high-frequency linear probe with sterile cover
Shoulder Procedures Chapter, p. 380
2. Position patient for posterior glenohumeral joint approach (seated, arm internally rotated)
Shoulder Procedures Chapter, p. 381
3. Identify humeral head, glenoid labrum, and posterior joint recess
Shoulder Procedures Chapter, p. 382
4. Insert needle in-plane from lateral to medial into joint space
Shoulder Procedures Chapter, pp. 382–383
5. For anterior approach, identify coracoid process and anterior joint recess
Shoulder Procedures Chapter, p. 384
6. Insert needle in-plane from lateral to medial under coracoid process
Shoulder Procedures Chapter, p. 385
7. For subacromial-subdeltoid bursa injection, position probe longitudinally over supraspinatus tendon
Shoulder Procedures Chapter, p. 386
8. Insert needle in-plane from lateral side into bursa, avoiding rotator cuff tendon
Shoulder Procedures Chapter, pp. 386–387
9. For biceps tendon sheath injection, place probe over bicipital groove
Shoulder Procedures Chapter, p. 388
10. Insert needle in-plane adjacent to tendon without penetrating fibers
Shoulder Procedures Chapter, p. 389
11. Confirm injectate spread with real-time ultrasound
Shoulder Procedures Chapter, p. 390

Assignment Type

Other

In-class and/or outside of class

In-class

Formative or Summative

Formative

Assignment

Procedures (Shoulder) Ultrasound-Guided Injections
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Objectives
- Understand ultrasound-guided injection techniques for common shoulder procedures.
- Recognize normal sonoanatomy relevant to procedural guidance and avoid critical structures.
Outline (Referenced from Chapter “Interventional Ultrasound: Shoulder” in Fundamentals of Musculoskeletal Ultrasound, 3rd Edition, pp. 377–396)
1. Anatomy & Technique
- Review relevant sonoanatomy for procedures:
* Glenohumeral joint.
* Subacromial-subdeltoid bursa.
* Long head of biceps tendon sheath.
- Discuss in-plane and out-of-plane approaches.
- Review sterile preparation and needle visualization techniques.
2. Pathology & Indications
- Common indications: bursitis, adhesive capsulitis, arthritis, rotator cuff tears with impingement.
- Pitfalls: poor needle visualization due to anisotropy, inadvertent injection into tendon fibers.
3. Injection Techniques
- Glenohumeral joint injection: posterior or anterior approach.
- Subacromial-subdeltoid bursa injection.
- Biceps tendon sheath injection.
4. Practical Tips & Limitations
- Always confirm needle tip location before injection.
- Use Doppler to avoid vascular structures.
- Avoid injecting through infected or compromised skin.

2-Hour Hands-On Application — Shoulder Procedure Checklist
Use the following checklist based on the procedural guidance outlined in the book's Interventional Ultrasound: Shoulder chapter (pp. 377–396). Students should perform each step while referencing the text and figures.
Step
Structure / Task
Reference
1. Prepare sterile field and high-frequency linear probe with sterile cover
Book Shoulder Procedures Chapter, p. 380
2. Position patient for posterior glenohumeral joint approach (seated, arm internally rotated)
Book Shoulder Procedures Chapter, p. 381
3. Identify humeral head, glenoid labrum, and posterior joint recess
Book Shoulder Procedures Chapter, p. 382
4. Insert needle in-plane from lateral to medial into joint space
Book Shoulder Procedures Chapter, pp. 382–383
5. For anterior approach, identify coracoid process and anterior joint recess
Book Shoulder Procedures Chapter, p. 384
6. Insert needle in-plane from lateral to medial under coracoid process
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8. Insert needle in-plane from lateral side into bursa, avoiding rotator cuff tendon
Book Shoulder Procedures Chapter, pp. 386–387
9. For biceps tendon sheath injection, place probe over bicipital groove
Book Shoulder Procedures Chapter, p. 388
10. Insert needle in-plane adjacent to tendon without penetrating fibers
Book Shoulder Procedures Chapter, p. 389
11. Confirm injectate spread with real-time ultrasound
Book Shoulder Procedures Chapter, p. 390

Assignment Type
Writing

In-class and/or outside of class
In-class

Formative or Summative
Formative

Assignment
Create an online quiz game in groups of 2. The quiz will consist of physics concepts for each weeks chapters as a review and will be played by the entire class. Collaboration between students enhances student learning by working together as a team to formulate quiz questions and reinforce MSK scanning concepts.

Course Materials

Textbooks
Fundamentals of Musculoskeletal Ultrasound, 4th Edition by Jon A. Jacobson, MD, FACR; ISBN: 9780323791502; Copyright: 2026

Class Size Information

Class Size
30

Class Size Category
F - Individualized, skills#based instruction/field practice 30

Diversity and Inclusion

Course Design and Materials: Course will incorporate diverse perspectives, authors, and examples that reflect a variety of cultures, identities, and lived experiences. Instructional materials will be reviewed regularly to ensure representation, inclusivity, and alignment with equity-minded practices across disciplines.

Inclusive Learning Environment: Instructors will establish classroom norms and policies that promote respect, civil discourse, and belonging in both online and face-to-face classes. Clear expectations for communication and engagement will support a learning space where all students feel valued and heard.

Accessible Instruction: Course content will be delivered using accessible design. Materials will follow accessibility guidelines within the CMS, including captioned media, readable document formats, and multiple means of engagement to support diverse learning.

Equitable Teaching Practices: Instructors will use transparent and grading criteria, varied assessment methods, and timely feedback to promote fairness and student success. Opportunities for revision, reflection, and multiple demonstrations of learning may be incorporated when appropriate to the discipline.

Culturally Responsive Pedagogies: Instructional strategies will encourage critical thinking about diverse perspectives and systems of power relevant to the course content. Faculty will foster opportunities for students to connect course material to real-world contexts.

Ongoing Reflection and Improvement: Faculty will engage in continuous professional development related to IDEAA principles and reflect on course practices using metacognition to identify opportunities for increased equity, inclusion, and accessibility.

Explain how diversity and inclusion(e.g., gender, culture/race, sexuality, etc.) is infused into the course.

This course has a lab component which enhances the classroom discussions with hands-on student interaction in pairs or groups. Students will practice patient-technologist interactions that include scenarios focused on cultural competence and communication. These scenarios will be examples of diverse populations which includes: ethnicity, gender, race, socioeconomic, language barriers and/or physical barriers. Students will submit a short written reflection in the CMS on ethical considerations and patient-centered care.

Describe how assignments, instruction, evaluation, course content, and interactions are contextualized for diverse learners promoting an equitable course.

This course provides opportunities for students to observe instructor demonstrations of knobology, ultrasound machine, transducers, scanning protocols and then practice what was observed. Students receive individualized and group instruction as they scan a volunteer. Instructors interact through face-to-face lectures where students may ask questions. Auditory and visual learners are supported through Voice-over lectures and concept specific videos. Office hours provide additional clarification of assignments or individualized scanning instruction. An equitable course supports diverse learners by offering flexible assignments, inclusive instruction, varied assessments, and culturally relevant content that reflects students' identities and experiences. It fosters respectful interactions and accessible communication, ensuring all students feel seen, supported, and empowered to succeed.

Interactions

Explain how the course will incorporate student-to-student interaction.

Student scan each other in the campus lab with interaction that supports tutoring and encouragement for each other in their scanning ability. Students are required to complete weekly lab check-off exercises in which students can support each other in completing these scan tasks.

Students compete together playing the online quiz game.

Explain how the course will incorporate instructor-to-student interaction.

This course provides opportunities for students to observe instructor demonstrations of knobology, ultrasound machine, transducers, scanning protocols and then practice what was observed. Instructors interact through face-to-face lectures where students may ask questions. The CMS houses announcements, syllabi, voice-over lectures, and course schedule through modules. Instructor uses real-life experience stories during lectures to enhance student learning. Instructor encourages use of office hours or meeting after class if student needs assistance or guidance.

Explain how the course will incorporate student-to-content interaction.

This course has a detailed textbook which acts as a study guide and prepares students in completing lab assignments and passing the ARDMS RMSK or RMSKS exam (registry exam for physicians or sonographer Musculoskeletal credentialing.) Students study text content, power point, video, and carry out hands-on tasks in the campus lab. The CMS houses announcements, syllabi, how-to-videos,

and course schedule through modules. Lab manuals are used extensively during lab sessions for step by step scanning instruction, reference, and reading assignments.

Explain how the course will incorporate student-to-self interaction (metacognitive).

To foster metacognitive engagement in the Musculoskeletal Sonography course, students will participate in structured self-reflection activities that deepen their awareness of scanning technique, diagnostic reasoning, and image optimization.

Through pre- and post-lab self-assessments and case-based reflection prompts, learners will evaluate their own performance, identify areas for improvement, and connect technical adjustments to clinical outcomes. Canvas modules will embed metacognitive questions that encourage students to monitor their confidence, compare modalities, and refine their strategies in real time. Additionally, students will curate portfolio artifacts with commentary to synthesize learning and demonstrate readiness for ARDMS MSK registry preparation.

These student-to-self interactions will support both sonographers and physicians in developing advanced MSK proficiency, aligning with the course's goal of enhancing diagnostic accuracy and expanding employment opportunities in sports medicine, orthopedics, and general imaging.

Key: 3227