Course Information

Course Description
This course offers a comprehensive study and systematic application of the biomechanics and pathomechanics of the human body with an emphasis on musculoskeletal tissues. In addition to assessing normal human movement, an introduction to postural assessments will be included in order to identify abnormal postural patterns. Additionally, an emphasis will be placed on normal and pathological components of gait. Furthermore, basic concepts of osteology, arthrology, neurology, and muscle activity are explored to better understand the interactions between joints and muscles. Clinical applications will be integrated throughout the course material. Laboratory will focus on the integration of lecture materials with practical clinical applications.

Course Credits
3 credits (3-1-0)

Contact Hours
Lecture: 48 Hours
Lab: 16 Hours

Prerequisite and Co-requisite Courses
Successful completion of courses during Summer 2020 in DPT program at Angelo State University

Prerequisite Skills
Successful completion of skills-based assessments during Summer 2020 in DPT program at Angelo State University

Program Outcomes
Upon completion of PT 7330 Clinical Anatomy, the student will be allowed to enroll in physical therapy courses during the subsequent spring semester of the DPT curriculum.
Student Learning Outcomes

COURSE OBJECTIVES: At the end of this course, the students will have demonstrated mastery of the subject by being able to:

1. Define and use appropriate kinesiological terminology to describe musculoskeletal structures and functions, specific joint and segment motions, postural alignment, patterns of functional movement, and gait.
   CAPTE criteria: 7A, 7C, 7D19

2. Apply the basic kinesiological principles of kinematics and biomechanics to normal human motion by:
   A. defining and location the centers of mass [COG] in the trunk and extremities;
   B. identifying examples of levers in the body;
   C. identifying examples of Newton’s Laws of Motion at during common functional movements;
   D. drawing vector diagrams to assist in understanding the distribution of loading throughout the body;
   E. discussing and understanding the relationship between mobility and stability in the production of normal movement.
   CAPTE criteria: 7A, 7C, 7D19

3. Apply kinesiological principles of kinematics and biomechanics to movement dysfunction.
   CAPTE criteria: 7A, 7C, 7D19

4. Describe the normative parameters and kinesiological structure and function related to the axial and appendicular skeleton.
   CAPTE criteria: 7A, 7C, 7D19

5. Discuss the role of each of the following when assessing movement dysfunction:
   A. muscle function – the following relationships will discussed as they pertain to skeletal muscle:
      1) characteristics associated with the passive, active, and total length tension curves;
      2) characteristics of the force-velocity relationship for concentric, isometric, and eccentric muscle activation types
      3) discuss concepts of positive and negative muscular power and work as they relate to common functional activities and injury risk
   B. joint range of motion;
   C. joint mobility;
   D. stabilization;
   E. innervation.
   F. balance
   CAPTE criteria: 7A, 7C, 7D19

6. Demonstrate appropriate techniques for observation and measurement of the surface landmarks, muscles, bony landmarks and joints of the axial and appendicular skeleton.
   CAPTE criteria: 7A, 7C, 7D19

7. Identify and describe each joint in the body according to its structural and functional characteristics and correlate these characteristics with activities of daily living such as walking and running gait.
   CAPTE criteria: 7A, 7C, 7D19

8. Discuss the influence of varying histologic makeup on the mechanical properties of muscle, tendon, ligament, and bone.
   CAPTE criteria: 7A
9. Identify and describe each of the following for each joint in the body:
   A. planes and axes of motion;
   B. close and open packed [resting] positions;
   C. rotatory and linear forces action during movement;
   D. innervation;
   E. attachments, innervations and actions of each muscle action at the joint;
   F. ligamentous and capsular structures.
   G. capsular patterns
   CAPTE criteria: 7A, 7C, 7D19

10. Examine human movement by:
    A. identifying the joint motions involved;
    B. describing each muscle’s contribution to production of movement;
    C. describing the type of muscle contractions performed during the movement;
    D. discussing the internal and external forces acting on the joint[s];
    E. identifying the different effects of open versus closed chain activity on muscles and joints.
    CAPTE criteria: 7A, 7C, 7D19

11. Analyze postural alignment by:
    A. describing the position of the body’s gravity line in optimal erect posture using appropriate
       points of reference;
    B. identifying muscles and ligaments which counterbalance gravity in optimal erect posture;
    C. observe and record postural lignment.
    CAPTE criteria: 7A, 7C, 7D19

12. Identify and discuss muscle and joint dysfunction and other biomechanical consequences
    associated with altered skeletal integrity and postural abnormalities including, but not limited to:
cubitus varus/valgus, abnormal acromion morphology, abnormal kyphotic and lordotic spinal
    curves, forward head/rounded shoulder sitting/standing posture, anterior/posterior pelvic tilt,
coxa vara/valga, femoral retroversion and excessive femoral anteversion, altered acetabular
    alignment, and altered quadriceps angle.
   CAPTE criteria: 7A, 7C, 7D19

13. Discuss and describe biomechanical principles as they apply to maintaining static and/or dynamic
    balance during common functional tasks performed during sitting, standing, and walking.
    CAPTE criteria: 7D19d

14. Analyze gait by:
    A. identifying the determinants of gait;
    B. identifying each of the phases of the gait cycle;
    C. describing internal & external forces acting across joint during the phases of the gait cycle;
    D. describing and assessing the center of gravity, base of support, and spatiotemporal
       characteristics during gait;
    E. comparing and contrasting gait cycles during walking and running.
    CAPTE criteria: 7A, 7C, 7D19
Course Delivery
This is a face-to-face, in-person course offering. Additionally, at the discretion of the coordinator, the course may be delivered via the Blackboard Learning Management System. The course site can be accessed at ASU's Blackboard Learning Management System. The primary means of course delivery will be traditional lecture format supplemented by class handouts and class discussions (of case studies, current literature, etc.). Laboratory-based activities will focus on reinforcing and enriching knowledge learned during lecture and the practical use and clinical application of skills and concepts discussed during class. Audiovisual and computer-assisted (synchronous and asynchronous) may be included in learning activities. Additionally, Angelo State University Blackboard and email addresses will be used for communication between professor and students.

Reading Assignments: Reading assignments are listed in the course schedule. You are responsible for the reading material before the beginning of class for each date. The professor may provide additional reading assignments per his/her discretion. It is critical that you perform all assigned readings as necessary to reinforce and understand concepts that were and were not covered in class. This may require performing part or all of the assigned readings more than once.

Required Texts and Materials

Optional Textbook (see coordinator prior to purchasing)
Technology Requirements

Among other equipment, a computer is essential for completing this course. Your computer is essential for downloading notes, articles, etc. and taking quizzes and exams. Please notify course instructors if you are unable to perform any of the aforementioned tasks using your computer.

Although this course is planned to be offered in person, it is possible that, due to unforeseen Covid-19 related restrictions, the course could get moved to an on-line/distance learning format. In order to accommodate such circumstances and participate in one of ASU’s distance education programs, you will need the following technology:

- A computer capable of running Windows 7 or later, or Mac OSX 10.8 or later
- The latest version of one of these web browsers: internet Explorer, Firefox, or Safari
- Microsoft Office Suite or a compatible Open Office Suite
- Adobe Acrobat Reader
- High Speed Internet Access
- Ethernet adapter cable required (wireless connections can drop during tests and Collaborate sessions)
- Webcam

At such, it would be ideal if you had this technology available to you. If you do not have technology that meets the specifications above that is okay. However, please let your professor know at your earliest convenience. Refer to Angelo State University’s Distance Education website for further technology requirements: [Angelo State University's Distance Education Website](#)
# Topic Outline

## PT 7330 Functional Biomechanical Relationships

### 2020 Course Schedule

Course schedule is subject to change at the discretion of the instructors

<table>
<thead>
<tr>
<th>Fall 2020</th>
<th>Functional Biomechanical Relationships</th>
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<tbody>
<tr>
<td>Course Coordinator: Dr. Lee Atkins, PT, PhD</td>
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<table>
<thead>
<tr>
<th>Tentative Course Schedule*</th>
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Communication
The professor will do his/her best to respond to email and/or telephone messages within 24 hours during working hours Monday through Friday. Weekend messages may not be returned until Monday.

Written communication via email: All private communication will be done exclusively through your Angelo State University email address. It is imperative that you frequently check your Angelo State University email and the course on Blackboard for announcements and policy changes. In your emails to faculty, include the course name and section number in your subject line.

Grading

Evaluation and Grades

<table>
<thead>
<tr>
<th>FINAL COURSE GRADE EVALUATIVE PROCEDURES:</th>
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<tbody>
<tr>
<td>Exam 1</td>
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<td>Exam 2</td>
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<td>Laboratory Activities</td>
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<td>Professionalism</td>
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<td>Quizzes</td>
<td>4</td>
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<td><strong>Total</strong></td>
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Exams: Five examinations will be given. Each exam will be timed and online (see below for a detailed description of exam format). Collectively, your five exams will account for 85% of your final course grade.

Lab Activities: The laboratory activities in this course will account for 6% of your final course grade. Your grade on laboratory activities will be a combination of student participation and the quality and timeliness of graded, in/outside-of-class lab assignments.

<table>
<thead>
<tr>
<th>Laboratory Grade Evaluative Procedures:</th>
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<tbody>
<tr>
<td>Upper Extremity Disarticulation Handout</td>
<td>25</td>
</tr>
<tr>
<td>Lower Extremity Disarticulation Handout</td>
<td>25</td>
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<tr>
<td>Participation in Laboratory Activities</td>
<td>50</td>
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<tr>
<td><strong>Total (worth 6 points of final grade)</strong></td>
<td><strong>100</strong></td>
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**Professionalism:** The professionalism grade will account for 5% of your final grade. Students are expected to behave in a manner consistent with the ASU Honor Code (see below) and that expected of a professional clinician. As such, factors that influence the professionalism grade include, but are not limited to: tardiness, attendance, classroom interaction, interaction with professor and classmates, Academic Honesty policies and procedures, and compliance. Students must be present for all exams and quizzes. All students will begin the course with 100% of their professional behavior points. Professional behavior points will only be deducted if following verbal instructions from the faculty, the deficiencies or problems are not properly addressed or corrected.

**Quizzes:** The quizzes will account for 4% of your final grade. Quizzes will be administered at the discretion of the professor and are intended to assist students in identifying their strengths and weaknesses regarding the material covered to date. At the end of the course all quizzes will be averaged. This quiz average is worth 4 percent of the final grade.
Grading System

- Written examinations may consist of multiple choice, true-false, matching, short answer, fill-in-the-blank, essay questions and patient case studies. The examinations will address knowledge, analysis and application of concepts covered in the course. Each written examination will be cumulative covering previously presented material in the curriculum. Students are expected to take all written examinations on the day they are scheduled. There will be no make-up examinations.

- The final course grade will be assigned based on the cumulative percentage of points earned throughout the course:
  
  - A = 90-100
  - B = 80-89
  - C = 70-79
  - F = 69 or less

  Students must score 80% or better in total (A or B grade) in order to meet mastery and receive credit for this course. Students who receive a failing course grade are subject to dismissal from the DPT program. Exceptions may be sought by petition of the Academic Committee of the Physical Therapy Program.

Teaching Strategies

Students are expected to be “active learners.” It is a basic assumption of the instructor that students will be involved (beyond the materials and lectures presented in the course) discovering, processing, and applying the course information using peer-reviewed journal articles, researching additional information and examples on the Internet, and discussing course material and clinical experiences with their peers. While students are oftentimes capable of memorizing various facts, it is expected that you expand your learning to reasoning and integration of material from various sources. Compared to the former, the latter style of learning requires much more time and effort. However, it is imperative that you are able to integrate information and critically analyze various problems in order to come up with suitable solutions.

Assignment and Activity Descriptions

See course schedule
General Policies Related to This Course

All students are required to follow the policies and procedures presented in these documents:

- Angelo State University Student Handbook\(^1\)
- Angelo State University Catalog\(^2\)
- Angelo State University DPT Student Handbook found on Blackboard in the DPT Program Contents

Student Responsibility and Attendance

ATTENDANCE/TARDINESS POLICY

Attendance and promptness to classes, meetings, and future work obligations are considered professional behaviors. As this department is preparing potential professionals in the area of physical therapy, it is part of our expectation that student presence and timeliness will be held in highest regard. Tardiness is a disruption to the instructor and fellow students. A student is considered tardy if he/she arrives for class after the instructor has begun class activities. Please see the following related to implications from excessive lateness or absences without a reasonable excuse:

- First offense - verbal warning
- Second offense - second verbal warning, initiation of Disciplinary Tracking Form.
- Third offense - 1% off final course grade
- 1% off final course grade for each additional unexcused tardy or absence

Per the student handbook, **2 or more occurrences combined or mixed will result in the initiation of a Disciplinary Tracking Form.**

If the student is unable to attend class, it is the student’s responsibility to either call the PT office at 942-2545 or the office of the professor of the class directly. This notification should be made prior to commencement of said class.

Continued issues with tardiness/attendance across all courses will result in disciplinary probation and will be referred to the PT faculty for consideration of options, including program dismissal.

The PT faculty is not oblivious to doctor’s appointments and other potential hazards and emergencies in daily life. Simply taking responsibility to notify the office or the professor if issues arise is considered professional behavior. Please do not rely on a classmate or other form of notification, as these have proven unreliable in years past.

**ATTENDANCE AT ALL SCHEDULED EXAMINATIONS IS MANDATORY.** Any unexcused absence from an examination will automatically result in a score of ZERO for that examination. Any student absent from examinations due to illness or injury must have a written justification from their physician. **Absence from an examination for any other reason must be excused before the time of the scheduled examination** or brought about by a very serious circumstance. For excused absences only, make-up examinations must be taken no later than one week after the student returns to class. Extended absences must be approved by the Program Director of Physical Therapy.
**Cell Phones**
Students must silence cell and place them out of sight during class. Permission may be granted, at the instructor's discretion, to have a cell phone out during class. Students seeking permission to have cell phones out during class must do so prior to the start of class. The first offense includes a verbal warning that will be documented in the behavioral tracking sheet. The second offense includes the initiation of a disciplinary tracking form. The third offense will result in the convening of a disciplinary committee to decide upon further disciplinary action.

**Academic Integrity**
Students are expected to maintain complete honesty and integrity in all work. Any student found guilty of any form of dishonesty in academic work is subject to disciplinary action and possible expulsion from ASU.

The College of Health and Human Services adheres to the university’s [Statement of Academic Integrity](#).³

**Accommodations for Students with Disabilities**
ASU is committed to the principle that no qualified individual with a disability shall, on the basis of disability, be excluded from participation in or be denied the benefits of the services, programs or activities of the university, or be subjected to discrimination by the university, as provided by the Americans with Disabilities Act of 1990 (ADA), the Americans with Disabilities Act Amendments of 2008 (ADAAA) and subsequent legislation.

Student Disability Services is located in the Office of Student Affairs, and is the designated campus department charged with the responsibility of reviewing and authorizing requests for reasonable accommodations based on a disability. It is the student’s responsibility to initiate such a request by contacting an employee of the Office of Student Affairs, in the Houston Harte University Center, Room 112, or contacting the department via email at ADA@angelo.edu. For more information about the application process and requirements, visit the [Student Disability Services website](#).⁴ The employee charged with the responsibility of reviewing and authorizing accommodation requests is:

Dallas Swafford  
Director of Student Disability Services  
Office of Student Affairs  
325-942-2047  
dallas.swafford@angelo.edu  
Houston Harte University Center, Room 112
Incomplete Grade Policy

It is policy that incomplete grades be reserved for student illness or personal misfortune. Please contact faculty if you have serious illness or a personal misfortune that would keep you from completing course work. Documentation may be required. See ASU Operating Policy 10.11 Grading Procedures for more information.

Plagiarism

Plagiarism is a serious topic covered in ASU’s Academic Integrity policy in the Student Handbook. Plagiarism is the action or practice of taking someone else’s work, idea, etc., and passing it off as one’s own. Plagiarism is literary theft.

In your discussions and/or your papers, it is unacceptable to copy word-for-word without quotation marks and the source of the quotation. It is expected that you will summarize or paraphrase ideas giving appropriate credit to the source both in the body of your paper and the reference list.

Papers are subject to be evaluated for originality. Resources to help you understand this policy better are available at the ASU Writing Center.

Student Absence for Observance of Religious Holy Days

A student who intends to observe a religious holy day should make that intention known in writing to the instructor prior to the absence. See ASU Operating Policy 10.19 Student Absence for Observance of Religious Holy Day for more information.

Copyright Policy

Students officially enrolled in this course should make only one printed copy of the given articles and/or chapters. You are expressly prohibited from distributing or reproducing any portion of course readings in printed or electronic form without written permission from the copyright holders or publishers.

Syllabus Changes

The faculty member reserves the option to make changes as necessary to this syllabus and the course content. If changes become necessary during this course, the faculty will notify students of such changes by email, course announcements and/or via a discussion board announcement. It is the student’s responsibility to look for such communications about the course on a daily basis.
Title IX at Angelo State University

Angelo State University is committed to providing and strengthening an educational, working, and living environment where students, faculty, staff, and visitors are free from sex discrimination of any kind. In accordance with Title VII, Title IX, the Violence Against Women Act (VAWA), the Campus Sexual Violence Elimination Act (SaVE), and other federal and state laws, the University prohibits discrimination based on sex, which includes pregnancy, and other types of Sexual Misconduct. Sexual Misconduct is a broad term encompassing all forms of gender-based harassment or discrimination and unwelcome behavior of a sexual nature. The term includes sexual harassment, nonconsensual sexual contact, nonconsensual sexual intercourse, sexual assault, sexual exploitation, stalking, public indecency, interpersonal violence (domestic violence or dating violence), sexual violence, and any other misconduct based on sex.

You are encouraged to report any incidents involving sexual misconduct to the Office of Title IX Compliance and the Director of Title IX Compliance/Title IX Coordinator, Michelle Boone, J.D. You may submit reports in the following manner:

Online:  www.angelo.edu/incident-form
Face to face: Mayer Administration Building, Room 210
Phone:  325-942-2022
Email:  michelle.boone@angelo.edu

Note, as a faculty member at Angelo State, I am a mandatory reporter and must report incidents involving sexual misconduct to the Title IX Coordinator. Should you wish to speak to someone in confidence about an issue, you may contact the University Counseling Center (325-942-2371), the 24-Hour Crisis Helpline (325-486-6345), or the University Health Clinic (325-942-2171).

For more information about resources related to sexual misconduct, Title IX, or Angelo State’s policy please visit: www.angelo.edu/title-ix.

Course Schedule
See under Topic Outline.

Grading Rubrics
n/a
Course Syllabus Statement on Required Use of Masks/Facial Coverings by Students in Class At Angelo State University

As a member of the Texas Tech University System, Angelo State University has adopted the mandatory *Facial Covering Policy* to ensure a safe and healthy classroom experience. Current research on the COVID-19 virus suggests there is a significant reduction in the potential for transmission of the virus from person to person by wearing a mask/facial covering that covers the nose and mouth areas. Therefore, in compliance with the university policy students in this class are required to wear a mask/facial covering before, during, and after class. Faculty members may also ask you to display your daily screening badge as a prerequisite to enter the classroom. You are also asked to maintain safe distancing practices to the best of your ability. For the safety of everyone, any student not appropriately wearing a mask/facial covering will be asked to leave the classroom immediately. The student will be responsible to make up any missed class content or work. Continued non-compliance with the Texas Tech University System Policy may result in disciplinary action through the Office of Student Conduct.

Student Evaluation of Faculty and Course

Students in all programs are given the opportunity to evaluate their courses and the faculty who teach them. Evaluations are most helpful when they are honest, fair, constructive, and pertinent to the class, clinical experience, or course. Faculty value student evaluations, and use student suggestions in making modifications in courses, labs and clinical experiences. Angelo State University uses the IDEA (Individual Development and Educational Assessment) system administered through Kansas State University for all course evaluations. The Office of Institutional Research and Assessment administers IDEA for the entire university, online and has established a policy whereby students can complete course evaluations free from coercion.

End of Syllabus

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1 https://www.angelo.edu/student-handbook/
2 https://www.angelo.edu/catalogs/
3 https://www.angelo.edu/student-handbook/community-policies/academic-integrity.php
4 https://www.angelo.edu/services/disability-services/
5 https://www.angelo.edu/content/files/14197-op-1011-grading-procedures
6 https://www.angelo.edu/student-handbook/community-policies/academic-integrity.php
7 https://www.angelo.edu/dept/writing_center/academic_honesty.php
8 https://www.angelo.edu/content/files/14206-op-1019-student-absence-for-observance-of