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 INSTRUCTOR(s): Lee Atkins, PT, PhD
Assistant Professor
Office: VIN 230
325-486-6865
Lee.atkins@angelo.edu

OFFICE HOURS: By Appointment

COURSE LOCATION: Lecture: SIII 213
Laboratory: SIII 213, SIII 212 F, CAV 202

MEETING HOURS: Monday-Wednesday 1:00pm – 3:00pm [3 hr lec & 1 hr lab/wk]

CLOCK HOURS: 48 lecture/16 lab

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;
   B. joint range of motion;
   C. joint mobility;
   D. stabilization;
   E. innervation.
CAPTE criteria: 7A, 7C, 7D19

6. Demonstrate appropriate techniques for observation, palpation 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.
CAPTE criteria: 7A, 7C, 7D19

8. 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

9. 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

10. 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 alignment.
CAPTE criteria: 7A, 7C, 7D19

11. Identify and discuss types of muscle and joint dysfunction that can result in abnormal postures.
12. Analyze gait by:
   A. identifying the determinants of gait;
   B. identifying each of the phases of the gait cycle;
   C. describing the internal and external forces acting at each joint during each phase of the gait cycle;
   D. describing and assessing the center of gravity, base of support, step and stride length, cadence and velocity of gait;
   E. comparing and contrasting gait cycles during walking and running.

**TEACHING METHODS/PHILOSOPHY:** Traditional lecture format supplemented by class handouts, group and individual presentations and/or discussion of case studies and current literature. Laboratory sessions will focus on the practical use and clinical applications of skills and concepts discussed during lectures in laboratory. Audiovisuals and computer-assisted instruction as appropriate will be included in learning activities. Blackboard will be used to communicate between instructors and students.

**TENTATIVE SCHEDULE:** See attached.

**REQUIRED TEXTBOOKS:**


**RECOMMENDED TEXTBOOKS:**


**GRADING/EVALUATIVE PROCEDURES:**

<table>
<thead>
<tr>
<th>Component</th>
<th>Points</th>
</tr>
</thead>
<tbody>
<tr>
<td>Exam 1</td>
<td>17</td>
</tr>
<tr>
<td>Exam 2</td>
<td>17</td>
</tr>
<tr>
<td>Exam 3</td>
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<td>Exam 4</td>
<td>17</td>
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<tr>
<td>Exam 5</td>
<td>17</td>
</tr>
<tr>
<td>Laboratory Activities</td>
<td>10</td>
</tr>
<tr>
<td>Professionalism</td>
<td>4</td>
</tr>
<tr>
<td>Quizzes</td>
<td>1</td>
</tr>
<tr>
<td><strong>Total</strong></td>
<td>100</td>
</tr>
</tbody>
</table>

**DETAILED BREAKDOWN OF COURSE GRADE COMPONENTS**

**Exam:** Exams will be comprehensive and based upon materials provided in lecture, assigned textbook readings, supplemental readings, and laboratory activities.
Laboratory Activities: The laboratory activities portion of the grade will be based upon student participation in all lab activities. Additionally, this grade may include graded, outside-of-class activities that must be turned in.

Quizzes: 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.

Professionalism: 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, ASU Honor Code compliance, etc. Students must be present for all exams and quizzes. Mastery for this course is set at 80%. There will be no curve.

GRADING:

<table>
<thead>
<tr>
<th>Score Range</th>
<th>Grade</th>
</tr>
</thead>
<tbody>
<tr>
<td>90+</td>
<td>A</td>
</tr>
<tr>
<td>80-89</td>
<td>B</td>
</tr>
<tr>
<td>70-79</td>
<td>C</td>
</tr>
<tr>
<td>&lt;70</td>
<td>F</td>
</tr>
</tbody>
</table>

HONOR CODE STATEMENT

Our students believe that ASU students should maintain complete honesty and integrity in their academic pursuits. The Honor Code at ASU describes expected academic behavior of both faculty and students, and it consists of an agreement between the student and the academic community to foster academic integrity, to value student educational goals, and to maintain the positive academic reputation of ASU. Angelo State University expects all students and faculty to engage in all academic pursuits in a manner that is above reproach and to maintain complete honesty and integrity in the academic experiences both in and out of the classroom. ASU students and faculty will not participate or condone

- Plagiarism
- Cheating
- Fabrication of data
- Misrepresentation of information
- Misuse of library materials
- Misuse of technology
- Conspiring with others to commit these acts

ASU students are responsible for understanding the Honor Code as well as the individual academic requirements and stipulations for each course. This includes carefully reading the Angelo State University Student Handbook and reading the syllabus of each course. Students should ask for clarification of any ambiguous aspect of the syllabus.

To facilitate this code of ethical conduct, ASU has an Academic Integrity Committee, a committee composed of both students and faculty, which has the responsibility of reviewing cases of suspected academic dishonesty, which may be brought to it. The committee's membership of students and faculty reinforces ASU's commitment to academic integrity in and out of the classroom.
STUDENTS WITH DISABILITIES

University Statement on 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 Act of 2008 (ADAAA), and subsequent legislation.

Student Affairs is the designated campus department charged with the responsibility of reviewing and authorizing requests for reasonable accommodations based on a disability, and it is the student’s responsibility to initiate such a request by emailing ADA@angelo.edu, or by contacting:

Mrs. Dallas Swafford
Director of Student Disability Services
Office of Student Affairs
University Center, Suite 112
325-942-2047 Office
325-942-2211 FAX
Dallas.Swafford@angelo.edu

When a student states he or she could meet the program’s technical standards with accommodation(s), the Office of Student Affairs will confirm that the stated condition qualifies as a disability under applicable laws. If the condition qualifies as a disability, the University will determine if it agrees that the student can meet the technical standards with reasonable accommodation; this includes a review of whether or not the accommodation requested is reasonable, taking into account whether or not the accommodation would jeopardize clinician/patient safety or the educational process of the student or the institution, including all course work, clinical educational experiences and internships deemed essential to graduation. Students are required to read and sign the DPT program’s technical standards (DPT Program Student Handbook Appendix I) form and to update their responses on this form if their health status changes.

A student who requires accommodation to meet the technical standards must obtain verification by the Office of Student Affairs that proper reasonable accommodation is available for the student to meet the standard. The program will not provide accommodation without such written verification.

RELIGIOUS HOLY DAYS
Faculty will provide accommodations for student absences for observance of a religious holy day(s) (OP 10.19). Students should make every effort to inform a faculty member at the beginning of the semester regarding these absences.

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:

a. First offense - verbal warning
b. Second offense - second verbal warning, initiation of Disciplinary Tracking Form.
c. Third offense - 1% off final course grade
d. 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 a student has an unexcused absence during integrations it may lead to the removal of that student from that clinical environment. It is the responsibility of the student to contact the clinical site and give notice if they are ill, or have transportation issues.

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.
# Tentative Course Schedule

**PT 7330 --Fall 2016**  
**Functional Biomechanical Relationships**  
**Course Coordinator: Dr. Lee T. Atkins, PT, PhD**

<table>
<thead>
<tr>
<th>DATE (Mon/Wed)</th>
<th>LECTURE / LAB TOPICS</th>
<th>Location</th>
<th>REQUIRED READINGS**</th>
</tr>
</thead>
<tbody>
<tr>
<td>August 28th (Monday)</td>
<td>Overview Syllabus Introduction to Biomechanics</td>
<td>SIII 213</td>
<td>Neumann Chapter 1 (pg. 3-26)</td>
</tr>
<tr>
<td>August 30th (Wednesday)</td>
<td>Basic Structure and Function of Human Joints</td>
<td>SIII 213</td>
<td>Neumann Chapter 2 (pg 28-44)</td>
</tr>
<tr>
<td>September 4th (Monday)</td>
<td>LABOR DAY!</td>
<td>SIII 213</td>
<td>Neumann Chapter 3 (pg 28-44) Neumann Chapter 4 (pg 77-83 &amp; 88-94)</td>
</tr>
<tr>
<td>September 6th (Wednesday)</td>
<td>Skeletal Muscle &amp; Biomechanical Principles</td>
<td>SIII 213</td>
<td>Neumann Chapter 4 (pg 77-83 &amp; 88-94)</td>
</tr>
<tr>
<td>September 11th (Monday)</td>
<td>Biomechanical Principles</td>
<td>SIII 213</td>
<td>Neumann Chapter 5</td>
</tr>
</tbody>
</table>
| September 13th (Wednesday) | Shoulder | SIII 213 | Neumann Chapter 5  
Exam 1 |
| September 18th (Monday) | Shoulder  
Elbow | SIII 213 | Neumann Chapter 5  
Neumann Chapter 6 |
| September 20th (Wednesday) | Elbow  
Wrist & Hand | SIII 213 | Neumann Chapter 6  
Neumann Chapter 7 |
| September 25th (Monday) | Wrist & Hand | SIII 213 | Neumann Chapter 7 |
| September 27th (Wednesday) | Anatomy Lab  
(UΕ Joint disarticulation) | Anatomy Lab | TBA |
| October 2nd (Monday) | SI Joint  
Exam 2 | SIII 213 | Neumann Chapter 9 (pg: 359-364)  
Exam 2 |
| October 4th (Wednesday) | SI Joint  
Lumbar Spine | SIII 213 | Neumann Chapter (TBA) |
| October 9th (Monday) | Lumbar Spine  
Thoracic Spine | SIII 213 | Neumann Chapter (TBA) |
| October 11th (Wednesday) | Thoracic Spine  
Cervical Spine | SIII 213 | Neumann Chapter (TBA) |
| October 16th (Monday) | Cervical Spine | SIII 213 | Neumann Chapter (TBA) |
| October 18th (Wednesday) | Hip Joint  
Exam 3 | SIII 213 | Neumann Chapter (TBA)  
Exam 3 |
| October 23rd (Monday) | Hip Joint  
Knee Joint | SIII 213 | Neumann Chapter (TBA) |
| October 25th (Wednesday) | Knee Joint  
Foot and Ankle | SIII 213 | Neumann Chapter (TBA) |
<p>| October 30th (Monday) | Foot and Ankle | SIII 213 | Neumann Chapter (TBA) |</p>
<table>
<thead>
<tr>
<th>Date</th>
<th>Event</th>
<th>Location</th>
<th>Reading Source</th>
</tr>
</thead>
<tbody>
<tr>
<td>November 1st</td>
<td>Foot and Ankle Review Q &amp; A Session</td>
<td>SIII 213</td>
<td>Neumann Chapter (TBA)</td>
</tr>
<tr>
<td>November 6th</td>
<td>Anatomy Lab (LE Joint disarticulation)</td>
<td>Anatomy Lab</td>
<td>TBA</td>
</tr>
<tr>
<td>November 8th</td>
<td>Exam 4</td>
<td>SIII 213</td>
<td>Exam 4</td>
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<tr>
<td>November 13th</td>
<td>Normal Gait</td>
<td>SIII 213</td>
<td>Perry Chapter (TBA)</td>
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<tr>
<td>November 15th</td>
<td>Normal Gait</td>
<td>SIII 213</td>
<td>Perry Chapter (TBA)</td>
</tr>
<tr>
<td>November 20th</td>
<td>Abnormal Gait</td>
<td>SIII 213</td>
<td>Perry Chapter (TBA)</td>
</tr>
<tr>
<td>November 22nd</td>
<td>THANKSGIVING BREAK!</td>
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<tr>
<td>November 27th</td>
<td>Running Gait</td>
<td>SIII 213</td>
<td>Perry Chapter (TBA)</td>
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<td>November 29th</td>
<td>EMG Lab</td>
<td>CAV 202</td>
<td>TBA</td>
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<td>November 30th</td>
<td>Make-up Day</td>
<td>SIII 213</td>
<td>TBA</td>
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<td>December 4th</td>
<td>Gait Lab</td>
<td>CAV 202</td>
<td>TBA</td>
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<tr>
<td>December 6th</td>
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<td>CAV 202</td>
<td>TBA</td>
</tr>
<tr>
<td>December 11th</td>
<td>Running Gait Lab</td>
<td>CAV 202</td>
<td>TBA</td>
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<tr>
<td>December 13th</td>
<td>Exam 5</td>
<td>SCI III</td>
<td>Exam 5</td>
</tr>
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</table>

*The instructor reserves the right to modify the above schedule.*  
**Readings listed above are from the Neumann and/or Perry texts unless otherwise noted by course coordinator.*