

**San José State University**  
**CASA/Kinesiology**  
**KIN 272 Evidence Based Research in the Practice of Therapeutic**  
**Exercise Fall 2018**

**Course and Contact Information**

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<b>Office Hours:</b>	Mon and Wed: 3:00 - 4:00 pm
<b>Class Days/Time:</b>	Monday 7 - 9:45 pm
<b>Classroom:</b>	YUH 128
<b>Prerequisites:</b>	KIN 155, KIN 158 and KIN 188 (or equivalent).

**Course Format**

Course materials such as syllabus, handouts, notes, assignment instructions, etc. can be found on the Canvas learning management system used at SJSU. You are responsible for changing the settings so that e-mail that is sent to your Canvas account is forwarded to your regularly used email account. Announcements will be posted on Canvas and should be checked on a regular basis; students may choose to be alerted via text or email that announcements have been made.

**Course Description**

This is a graduate course designed to those who passed the Board of Certification, ATC and admitted to the Graduate Athletic Training Education Program. The course is also designed to critically examine current practices in therapeutic exercise and rehabilitation-specific interventions with regard to athletic injuries. The course will take a multidisciplinary approach, incorporating scientific (research) and philosophical bases. The course is intended to provide the student with the information necessary to perform prudent clinical applications of therapeutic exercise programs and athletic rehabilitation-specific interventions.

**Department of Kinesiology Graduate Program Learning Outcomes (GPLO)**

Upon completion of the Master's degree program in the Department of Kinesiology, students should be able to:

1. Demonstrate the ability to conduct and critique research using theoretical and applied knowledge.
2. Interpret and apply research findings to a variety of disciplines within Kinesiology.

3. Effectively communicate essential theories, scientific applications, and ethical considerations in each student's Kinesiology program concentration.
4. Interpret and apply research findings through acquired skills in order to become agents of change to address issues in Kinesiology through the application of knowledge and research.

### **Graduate Athletic Training Education Program Learning Outcomes (GATEPLO)**

The mission of the Graduate Athletic Training Program is to enhance the mastery of athletic training discipline through a sound theoretical and research base, as well as diversity of thought and experiences. The Graduate Athletic Training Education Program seeks to:

1. Develop critical and independent thinkers
2. Facilitate and promote community interaction/aid in sports medicine with other health care providers
3. Foster scholarly and research activities
4. Develop exemplary athletic training professionals
5. Enhance and augment athletic training skills through evidence based exploration

### **Course Learning Outcomes (CLO)**

Upon successful completion of this course, students will be able to:

CLO 1. Develop the concept of therapeutic exercises designed to facilitate the physical re-conditioning after injury and strength of collagenous tissues.

1.1. Purpose of exercises

- 1.1.1. Regain or improve range of motion (ROM)
- 1.1.2. Strength of muscles
- 1.1.3. Coordination through dual tasks
- 1.1.4. Differentiate the theory of neuromuscular control of movement from proprioception
- 1.1.5. Concept of motor learning in therapeutic exercises
- 1.1.6. Outcomes of assessment testing algorithm
- 1.1.7. Isokinetic tests

1.2. Intensity /weight loads

1.3. Planes of motion

1.4. Volumes of exercise (repetitions and sets, frequencies per week)

CLO 2. Identify the principle of kinetic chain

CLO 3. Demonstrate types of muscular contractions in therapeutic exercises

CLO 4. Apply physiological and biomechanical effects of muscle activity on postural control with a variety of body positions: lying, quadruped, kneeling, and standing position, to the common treatment/exercise techniques employed in the rehabilitation process.

4.1. Balance Error Scoring System

4.2. Y-Balance/Star Excursion Balance Test

CLO 5. Evaluate critical thought and scientific evidence to make sound decisions regarding the ACL injury prevention, and identify updated assessments of interventions and exercises including

double legged drop jump

CLO 6. Identify the theory of rhythmical movement

6.1. The mechanism of preprogram and anticipation in the view point of core and proximal extremity

CLO 7. Demonstrate core stability exercises for injured athletes

CLO 8. Demonstrate the shoulder rehabilitation techniques with evidences (research findings)

CLO 9. Demonstrate the conceptual framework of therapeutic exercises

9.1. Low Back Pain

9.2. Hamstring Injury

9.3. Chronic Ankle Instability

9.4. Post ACL Reconstruction

### **Required Readings**

Selected readings to be provided by the instructor. All readings are shown in the end of syllabus.

### **Course Requirements and Assignments**

SJSU classes are designed such that in order to be successful, it is expected that students will spend a minimum of forty-five (45) hours for each unit of credit (normally three hours per unit per week), including preparing for class, participating in course activities, completing assignments, and so on. More details about student workload can be found in [University Policy S12-3](http://www.sjsu.edu/senate/docs/S12-3.pdf) at <http://www.sjsu.edu/senate/docs/S12-3.pdf>.

Each student will be required to:

1. Review the articles selected in each of the topics to discuss proficiency in using numerous psychomotor skills to rehabilitate various anatomical and supportive structures.
2. Participate in class discussions and hands-on practices actively.
3. Present the aforementioned rehabilitation program for extremities and core stability exercises and demonstrate the techniques to the class.
4. Critically review selected literature.

### **Grading Information**

- Midterm Exam: 20%
- Conceptual Framework for Therapeutic Exercises: 40%
- Summary of Therapeutic Exercise: 10%
- Proactive class participation: 10%
- Final Exam (comprehensive) : 20%

### **Determination of Grades**

The course is based on a percentage scale (100%). The breakdown is as follows:

A: 100-93%    A-: 92.9-90%  
B+: 89.9-87%    B: 86.9-83%    B-: 82.9-80%  
C+: 79.9-77%    C: 76.9-73%    C-: 72.9-70%  
D+: 69.9-67%    D: 66.9-63%    D-: 62.9-60%    F: <60%

## **Midterm Exam: 20%**

There will be one midterm exam covering all materials (lectures, labs, discussions, readings, etc.) to date from ALL units discussed up to the purpose of therapeutic exercises, neuromuscular control of movement, proprioception, postural balance, chronic ankle instability, and knee injury prevention program.

The exam will be comprehensive, including true-false, multiple choice, and short essay questions that require integration and synthesis of knowledge. Excellent responses will demonstrate advanced and in-depth understanding of therapeutic exercises for injured athletes. Responses should include material from assigned readings and class discussions. (GPLO 1-4) (GATEPLO 1, 3, 5) (CLO 1-5)

## **Midterm Exam Date: October 22**

## **Conceptual Framework for Therapeutic Exercises: 40%**

This is part of active learning for you to enhance your critical thinking in the field of athletic training. You will be randomly assigned to a group with 4 members ideally to develop the conceptual framework for therapeutic exercise.

Each of the four assignments will give groups a certain theme with some type of injury either of chronic or acute injury: 1) chronic ankle sprain 2) Low Back Pain, 3) hamstring injury, and 4) Post-ACL reconstruction.

The conceptual framework must be developed with two kinds with three dimension. The three dimension, for instances, consist of the planes of motion in exercise, intensity (weight loads), and postural positions (lying, quadruped, kneeling, and standing position). The two kinds of exercises consist of open kinetic chain and closed kinetic chain exercise.

You will bring the exercises you have demonstrated for your injured athletes or learned from other athletic trainers to the class, and discuss with your member to conclude the conceptual framework for the theme each time. In the end of the class, a member of the group will demonstrate some exercises with rationales. Also, each of the groups develop two-page report with appropriate tables describing the exercises you discussed in the group (research). (GPLO 1-4) (GATEPLO 1, 3, 5) (CLO 9)

## **Each of the group report due is by the following week class**

\*This conceptual framework assignments are important to enhance your active learning. **All students are expected to actively participate in group discussion and hands-on exercise work-out.**

**Your absence more than two times will affect your conceptual framework points (-2 per each absence after two times).** Students who consider missing the class due to their clinical duties, such as travelling with your team, may make up the class absence to submit the assignment **individually only if a student asks a week prior to the class he or she misses.** However, no more than three assignments are given to make up in this assignment.

## **Summary of Therapeutic Exercise: 10%**

This is an opportunity for each of the students to organize the therapeutic exercises discussed in the class including all materials as well as the conceptual frameworks: 1) low back pain, 2) hamstring injury 3) chronic ankle sprain, and 4) Post-ACL reconstruction. You will develop this summery assignment along with the discussion notes which I prepared for the class. The idea of this assignment is for you to utilize as the references in your professional. (GPLO 1-4) (GATEPLO 1, 3, 5) (CLO 1, 9)

### **Proactive Class Participation: 10%**

Because of the nature of course work, each of the students will be expected to proactively participate in the class for the exercises and outcome assessments discussed during the course of class work. The students will have an opportunity to learn facilitator and moderator roles for each of the topics discussed in conceptual framework for therapeutic exercises. (GPLO 1-4) (GATEPLO 1-5) (CLO 3, 9)

### **Final Exam: 20%**

The final exam will be given to students who demonstrate mastery of course content through the Canvas (an online exam).

The exam will be comprehensive short essay questions that require integration and synthesis of knowledge for all materials covered in the class after the midterm. Excellent responses will demonstrate advanced and in-depth understanding of therapeutic exercises for injured athletes. Responses should include material from assigned readings and class discussions. (GPLO 1-4) (GATEPLO 1, 3, 5) (CLO 7, 8)

### **Final Exam Date: December 17**

Exams are to be taken on the dates scheduled. Make-up exams are permitted only for illness and emergency (TRULY EXTRAORDINARY CIRCUMSTANCES). The student is responsible for notifying the instructor and making arrangements at the earliest possible time. In most cases, the midterm exam must be completed before the next class meeting. All requests for make-up exams will be evaluated on an individual basis.

### **Classroom Protocol**

- All students in the class must be required *to set a silent mode for your cell phone*. Students are allowed to use your PC in the class. However, *you are not allowed to access any unnecessary internets or emails*.
- No food is allowed in the lab.
- The class will basically have no break, or short break (5-10 min) as necessary.

### **University Policies (Required)**

Per University Policy S16-9, university-wide policy information relevant to all courses, such as academic integrity, accommodations, etc. will be available on Office of Graduate and Undergraduate Programs' [Syllabus Information web page](http://www.sjsu.edu/gup/syllabusinfo/) at <http://www.sjsu.edu/gup/syllabusinfo/>

## KIN 272, Evidence-Based Research in the Practice of Therapeutic Exercise, Fall, 2018

### Course Schedule (Subject to change with advance notice)

Week	Date	Topics	Reading Assignments
1	8/27	Introduction to EBP in Therapeutic Exercise Neuromuscular control of movement vs. proprioception in therapeutic exercise Motor learning in therapeutic exercise	
2	9/3	<b>Labor Day - Campus Closed</b>	
3	9/10	Chronic ankle instability Foot & Ankle Disability Index Score Sports Ankle Rating System	1. Madsen. JOSPT 2018
4	9/17	Functional tests: <ul style="list-style-type: none"> <li>• Figure of 8 Hop</li> <li>• Side-Hop</li> <li>• Up-Down Hop</li> <li>• Single-Hop</li> <li>• SEBT: The Y Balance Test</li> <li>• Lunge Wall</li> <li>• Firm &amp; foam: SL w/Time in (sec) and Foot-Lift (x)</li> </ul>	2. Docherty. JAT 2005 3. Clanton. Sports Health. 2012 4. Linens. JAT 2014
5	9/24	<i>Mulligan concept by Eitan Gelber, MA, ATC, Director of Athletic Training, Stanford University</i>	
6	10/1	Knee (ACL) Injury Prevention Program: <ul style="list-style-type: none"> <li>• Single Hop for Distance</li> <li>• 6-m Timed Hop</li> <li>• Triple Hop for Distance</li> <li>• Crossover Hop for Distance</li> <li>• Agility T-Test</li> <li>• Lower Extremity Functional Tests (LEFT)</li> <li>• Lower Extremity Functional Scale (LEFS)</li> </ul>	5. Brumitt. IJSPT 2013 6. Reid. PT 2007
7	10/8	Core Stability Exercise (CEU: Category A 2 units) <b>Conceptual Framework for Therapeutic Exercise I</b> (An exercise program for a patient with chronic low back pain?)	7. Kibler. Sport Med 2006 8. Allison. JOSPT 2008 9. Wirth Sport Med 2017 10. Tsuruike. Translational Sports Med 2018
8	10/15	Postural Balance Balance Error Scoring System (BESS) Tandem gait test Y-Balance/Star Excursion Balance Test Lateral Step - Down Test *Review for the midterm exam	11. Stiffler. JOSPT 2015 12. Stiffler JOSPT 2017 13. Oldham Med Sci Sports Exer 2018 14. Rabin. JAT 2014 15. Gribble. JAT 2013
9	10/22	<b>Midterm</b>	

Week	Date	Topics	Reading Assignments
10	10/29	FMS Corrective Exercises for 1) Inline Lunge, 2) Hurdle Step, and 3) Deep Squat	
11	11/5	SFMA Corrective Exercises for 1) multi-segmental extension and 2) multi-segmental rotation	
12	11/12	Shoulder Rehabilitation Exercise in Overhead Athletes Stretching the shoulder and scapula	
13	11/19	<b>Conceptual Framework for Therapeutic Exercise II</b> (Hamstrings)	
14	11/26	<b>Conceptual Framework for Therapeutic Exercise III</b> (Chronic ankle instability)	
15	12/3	Concept of warm-up, stretching the lower extremity <b>Conceptual Framework for Therapeutic Exercise IV</b> (Post ACLR)	16. Hewett. AJSM 2017 17. Zebis. Br J Sports Med 2015 18. Struminger. Clinical Biomechanics 2013
16	12/10	Review overall of course works and discussion of therapeutic exercises	
Final Exam	12/17	<b>Final Exam</b>	

## READING ASSIGNMENTS

- Madsen, L. P., Hall, E. A., & Docherty, C. L. (2018). Assessing Outcomes in People With Chronic Ankle Instability: The Ability of Functional Performance Tests to Measure Deficits in Physical Function and Perceived Instability. *Journal of Orthopaedic & Sports Physical Therapy*, 48(5), 372-380.
- Docherty, C. L., Arnold, B. L., Gansneder, B. M., Hurwitz, S., & Gieck, J. (2005). Functional-performance deficits in volunteers with functional ankle instability. *Journal of athletic training*, 40(1), 30.
- Clanton, T. O., Matheny, L. M., Jarvis, H. C., & Jeronimus, A. B. (2012). Return to play in athletes following ankle injuries. *Sports Health*, 4(6), 471-474.
- Linens, S. W., Ross, S. E., Arnold, B. L., Gayle, R., & Pidcoe, P. (2014). Postural-stability tests that identify individuals with chronic ankle instability. *Journal of athletic training*, 49(1), 15-23.
- Brumitt, J., Heiderscheit, B. C., Manske, R. C., Niemuth, P. E., & Rauh, M. J. (2013). Lower extremity functional tests and risk of injury in division iii collegiate athletes. *International journal of sports physical therapy*, 8(3), 216-227.
- Reid, A., et al. (2007). Hop testing provides a reliable and valid outcome measure during rehabilitation after anterior cruciate ligament reconstruction. *Physical therapy*, 87(3), 337-349.
- Kibler, W. B., Press, J., & Sciascia, A. (2006). The role of core stability in athletic function. *Sports medicine*, 36(3), 189-198.
- Allison, G. T., Morris, S. L., & Lay, B. (2008). Feedforward responses of transversus abdominis are directionally specific and act asymmetrically: implications for core stability theories. *Journal of orthopaedic & sports physical therapy*, 38(5), 228-237.
- Wirth, K., Hartmann, H., Mickel, C., Szilvas, E., Keiner, M., & Sander, A. (2017). Core stability in athletes: a critical analysis of current guidelines. *Sports Medicine*, 47(3), 401-414.

10. Tsuruike, M., Munson, M., & Hirose, N. (2018). The effect of upper extremity rhythmical exercises on core stability muscle activities during standing position. *Translational Sports Medicine*, 1(3), 132-139.
11. Stiffler, M. R., Sanfilippo, J. L., Brooks, M. A., & Heiderscheit, B. C. (2015). Star Excursion Balance Test performance varies by sport in healthy division I collegiate athletes. *Journal of Orthopaedic & Sports Physical Therapy*, 45(10), 772-780.
12. Stiffler, M. R., Bell, D. R., Sanfilippo, J. L., Hetzel, S. J., Pickett, K. A., & Heiderscheit, B. C. (2017). Star Excursion Balance Test anterior asymmetry is associated with injury status in Division I collegiate athletes. *Journal of orthopaedic & sports physical therapy*, 47(5), 339-346.
13. Oldham, J. R., Difabio, M. S., Kaminski, T. W., Dewolf, R. M., Howell, D. R., & Buckley, T. A. (2018). Efficacy of Tandem Gait to Identify Impaired Postural Control after Concussion. *Medicine and science in sports and exercise*, 50(6), 1162-1168.
14. Rabin, A., Kozol, Z., Spitzer, E., & Finestone, A. (2014). Ankle dorsiflexion among healthy men with different qualities of lower extremity movement. *Journal of athletic training*, 49(5), 617-623.
15. Gribble, P. A., Kelly, S. E., Refshauge, K. M., & Hiller, C. E. (2013). Interrater reliability of the star excursion balance test. *Journal of athletic training*, 48(5), 621-626.
16. Hewett, T. E., et al. (2017). Effectiveness of neuromuscular training based on the neuromuscular risk profile. *The American journal of sports medicine*, 45(9), 2142-2147.
17. Zebis, M. K., et al. (2016). Effects of evidence-based prevention training on neuromuscular and biomechanical risk factors for ACL injury in adolescent female athletes: a randomised controlled trial. *Br J Sports Med*, 50(9), 552-557.
18. Struminger, A. H., et al. (2013). Comparison of gluteal and hamstring activation during five commonly used plyometric exercises. *Clinical biomechanics*, 28(7), 783-789.