

**Department of Kinesiology**  
**San José State University**

**KIN 154A**

**Instrumentation in Exercise Physiology & Biomechanics**  
**Fall 2009**

Instructor:	Peggy Plato, Ph.D.	Jim Kao, Ph.D.
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Office Hours:	M 10:00 am - 11:00 am T 1:00 pm - 2:00 pm 7:00 pm - 8:00 pm W 10:00 am - 12:00 noon Other times available by appointment	T 1:00 pm – 2:30 pm W 9:00 am – 11:00 am Th 1:00 pm – 2:30 pm
Class Days/Time	Sec 1 (Lecture) M 11:30-12:20 Sec 2 (Lab) MW 12:30-2:20	
Classroom:	SPX 208	
Prerequisites:	KIN 70, 155, 158, or equivalent	

**Course Description**

This class is designed to assist the student in becoming familiar and proficient with the methods and instruments of assessing physiological and biomechanical characteristics of human performance.

**Student Learning Outcomes (SLOs)**

Upon successful completion of the course requirements, the student will be able to:

- (1) demonstrate knowledge and use of instruments and procedures utilized in the measurement of physiological functioning and biomechanical analyses.
- (2) demonstrate proficiency in administering selected physiological and biomechanical tests.
- (3) interpret and explain test results.
- (4) demonstrate knowledge of the underlying principles, benefits, and limitations of selected physiological tests.
- (5) qualitatively and quantitatively analyze human movement using video data.
- (6) demonstrate sensitivity to age, gender, cultural, and other individual differences as they relate to the physiological and biomechanical assessment of human performance.
- (7) demonstrate critical thinking and problem solving skills.

## Methods

- (1) Lecture/discussion
- (2) Demonstration
- (3) Observation
- (4) Assigned readings
- (5) Laboratory experience - emphasis on hands-on practice to develop competence

## Course Content

- (1) Anthropometry & body composition
  - (a) Height, weight, circumferences, and bone diameters
  - (b) Bioelectrical impedance analysis (BIA)
  - (c) Skinfold measurements
  - (d) Hydrostatic weighing
  - (e) Air displacement plethysmography (Bod Pod)
- (2) Pulmonary function
  - (a) Spirometry: static and dynamic lung volumes
  - (b) Environmental conditions
  - (c) Residual volume: measuring and estimating
- (3) Fitness & health assessments - Trifit system, Cholestech
- (4) Qualitative and quantitative movement analysis utilizing video data
- (5) Miscellaneous topics
  - (a) Equipment calibration and operation
  - (b) Selection of tests
  - (c) Specifications of exercise test equipment
  - (d) Interpretation of results

## Evaluation

The final course grade will be determined 50% from the exercise physiology unit and 50% from the biomechanics unit. Specifics of grading will be given by the instructor for each half of the course.

## Requirements

- ! Heyward, V. H., & Wagner, D. R. (2004). *Applied body composition assessment* (2<sup>nd</sup> ed.). Champaign, IL: Human Kinetics.
- ! Robertson, G., Caldwell, G., Hamill, J., Kamen, G., & Whittlesey, S. (2004). *Research methods in biomechanics*. Champaign, IL: Human Kinetics.
- ! Course reader for exercise physiology — available at first class meeting. After first class meeting, available at Maple Press (481 E. San Carlos, 297-1000)
- ! Battery-operated calculator

## **University Policies**

### **Academic Integrity**

The University's [Academic Integrity Policy](http://sa.sjsu.edu/judicial_affairs/faculty_and_staff/academic_integrity/index.html) is available at [http://sa.sjsu.edu/judicial\\_affairs/faculty\\_and\\_staff/academic\\_integrity/index.html](http://sa.sjsu.edu/judicial_affairs/faculty_and_staff/academic_integrity/index.html). Your own commitment to learning, as evidenced by your enrollment at San José State University and the University's integrity policy, require you to be honest in all your academic course work. Faculty members are required to report all infractions to the office of [Student Conduct and Ethical Development](http://www.sa.sjsu.edu/judicial_affairs/index.html) located at [http://www.sa.sjsu.edu/judicial\\_affairs/index.html](http://www.sa.sjsu.edu/judicial_affairs/index.html). Plagiarism and cheating are serious offenses. Students should carefully read the attached information on academic integrity and plagiarism.

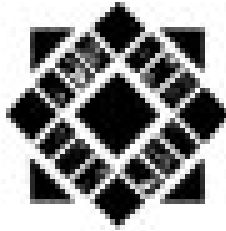
### **Campus Policy in Compliance with the American Disabilities Act**

If you need course adaptations or accommodations because of a disability, or if you need to make special arrangements in case the building must be evacuated, please make an appointment with me as soon as possible, or see me during office hours. Presidential Directive 97-03 requires that students with disabilities requesting accommodations must register with the [Disability Resource Center](http://www.drc.sjsu.edu/) (DRC) at <http://www.drc.sjsu.edu/> to establish a record of their disability. The DRC is located in ADM 110 (408-924-6000 [voice] or 408-924-5990 [TDD]).

### **Adding and Dropping**

September 3 is the last day to drop this course without a "W" being assigned. According to University policy, dropping this course after Sept. 3 is permissible only for serious and compelling reasons, and requires written documentation. Unsatisfactory performance in course work is not a serious and compelling reason. The last day to add the course is September 11. However, students who receive add codes should use them as soon as possible.





## **San José State** **UNIVERSITY**

The following information on academic integrity has been excerpted from the San José State University Academic Integrity Policy (policy S04-12). The complete policy is available at <http://www2.sjsu.edu/senate/S04-12.pdf>.

### **SAN JOSE STATE UNIVERSITY**

### **ACADEMIC INTEGRITY POLICY**

The University emphasizes responsible citizenship and an understanding of ethical choices inherent in human development. Academic honesty and fairness foster ethical standards for all those who depend upon the integrity of the university, its courses, and its degrees. This policy sets the standards for such integrity and shall be used to inform students, faculty and staff of the university's Academic Integrity Policy. The public is defrauded if faculty and/or students knowingly or unwittingly allow dishonest acts to be rewarded academically and the university's degrees are compromised.

#### **Student Role**

It is the role and obligation of each student to:

1. Know the rules that preserve academic integrity and abide by them at all times. This includes learning and following the particular rules associated with specific classes, exams and/or course assignments. Ignorance of these rules is not a defense to the charge of violating the Academic Integrity Policy.
2. Know what the consequences of violating the Academic Integrity Policy will be, students' appeal rights, and the procedures to be followed in the appeal.
3. Foster academic integrity among peers.

## **1.0 Definitions of Academic Dishonesty**

### **1.1 Cheating**

At SJSU, cheating is the act of obtaining or attempting to obtain credit for academic work through the use of any dishonest, deceptive, or fraudulent means. Cheating at SJSU includes but is not limited to:

- 1.1.1 Copying, in part or in whole, from another's test or other evaluation instrument including homework assignments, worksheets, lab reports, essays, summaries, quizzes, etc.;
- 1.1.2 Submitting work previously graded in another course unless this has been approved by the course instructor or by departmental policy;
- 1.1.3 Submitting work simultaneously presented in two courses, unless this has been approved by both course instructors or by the department policies of both departments;
- 1.1.4 Using or consulting, prior to, or during an examination, sources or materials not authorized by the instructor;
- 1.1.5 Altering or interfering with the grading process;
- 1.1.6 Sitting for an examination by a surrogate, or as a surrogate;
- 1.1.7 Any other act committed by a student in the course of their academic work which defrauds or misrepresents, including aiding or abetting in any of the actions defined above.

### **1.2 Plagiarism**

At SJSU plagiarism is the act of representing the work of another as one's own without giving appropriate credit, regardless of how that work was obtained, and/or submitting it to fulfill academic requirements. Plagiarism at SJSU includes but is not limited to:

- 1.2.1 The act of incorporating the ideas, words, sentences, paragraphs, or parts of, and/or the specific substance of another's work, without giving appropriate credit, and/or representing the product as one's own work;
- 1.2.2 Representing another's artistic/scholarly works such as musical compositions, computer programs, photographs, paintings, drawing, sculptures, or similar works as one's own.

## **2.0 Notification of Standards of Detecting Plagiarism**

- 2.1 SJSU or its faculty may subscribe to and/or use plagiarism detection services.

## KIN 154A, Part 1

### Instrumentation in Exercise Physiology

Evaluation	Weighting	Student Learning Objective
Competency Tests (2% each)	10%	1,2
Professionalism, Care of Equipment	5%	1
Anthropometric Lab	5%	1,3,7
BIA Lab	5%	1,3,7
Skinfold Lab	5%	1,3,7
Hydrostatic Weighing Lab	5%	1,3,7
Bod Pod Lab	5%	1,3,7
Spirometry Lab	5%	1,3,7
Trifit & Cholestech Lab	5%	1,3,7
Body Composition Project	13%	1,2,3,4,6,7
Quizzes (4 of 5 counted)	12%	3,4,6
Lab Practical Exam	10%	1,2,7
Written Midterm Exam	15%	3,4,6,7

#### Competency Tests

Students will demonstrate competency on ALL of the following:

- Measuring height
- Measuring weight
- Measuring skinfolds at the following sites: chest, triceps, subscapular, abdomen, suprailiac, and thigh
- Performing hydrostatic weighing
- Measuring barometric pressure

#### Grading on competency tests:

A (95%) = excellent technique (performed smoothly & with confidence, accurate results)

B (85%) = good technique, minor corrections needed

F (0%) = poor or weak technique, significant errors, questionable data, OR did not attempt competency

Students receiving less than an A grade will receive feedback and may, after further practice, retake the competency on another day. If a student does not attempt a competency by the first deadline date, the score may be lowered one letter grade for each week, or part of a week, that the deadline is missed. Students are responsible for scheduling their own competency tests. These may be scheduled during

labs or other nonclass times (if the instructor cannot test everyone during the scheduled lab period). If the test is not taken during a laboratory period, students must bring a client when one is needed. The last day to complete competencies is during the practical examination (if time allows, maximum of 1 competency tested.)

## **Professionalism, Care of Equipment**

This is a professional preparation course. Students are expected to:

- **Be fully prepared;** actively and enthusiastically participate in all laboratory sessions and class discussions.
- **Read assigned material and lab instructions BEFORE class.** (Lecture and lab time will be used to present material, help students master techniques, and check competencies. Students are directed to the green sheet and course reader for answers to many of their procedural questions.)
- Bring textbook, calculator, course reader, and other necessary supplies to class.
- Dress appropriately for scheduled activities.
- Participate in demonstrations and data collection.
- Enthusiastically serve as a client for others.
- PRACTICE, PRACTICE, PRACTICE techniques. ***Use your class time effectively!*** Ask for guidance from instructor if having difficulty mastering a technique.
- Complete competencies and assignments on time.
- Use equipment properly; clean and put away all equipment before leaving lab area.
- Keep lab clean. No food or drinks are allowed in the lab, except water.
- Maintain lab security (confidentiality of omnilock code; lock lab if leaving for even 1 min).

Students who consistently demonstrate professionalism, as described above, WILL be able to complete all lab assignments and competencies in a timely manner. Students who choose not to use laboratory time effectively may not complete all assignments, and should not expect the instructor to ensure that they do. **In an 8-week, lab-intensive class, if you fall behind it may be impossible to catch up.**

The most effective class results when EACH class member makes an INDIVIDUAL COMMITMENT to be an active participant in the teaching/learning process. Individual contributions and differing viewpoints will be appreciated and respected. Students are responsible for material presented and announcements made in each class. Students who miss class (a rare occurrence!) are responsible for obtaining material from another student BEFORE seeing the instructor about content missed.

## Labs and Body Composition Project

Guidelines and forms are in the course reader. Refer to the class schedule for due dates. Written work must be typed or neatly hand-written. Remember to proofread and check for completeness before turning in.

Due Date	Received	Grade Lowered
Monday	After class Mon. through Wed.	1 grade step (eg, B+ $\equiv$ B)
	Thurs. or Fri.	2 grade steps (eg, B+ $\equiv$ B-)
	Sat. through following Mon.	1 full grade (eg, B+ $\equiv$ C+)
Wednesday	After class Wed. through Fri.	1 grade step
	Sat. through Mon.	2 grade steps
	Tues. or following Wed.	1 full grade

Students must speak with the instructor regarding assignments that are over 1 week late.

## Laboratory Practical Exam

- ! Students will demonstrate skill on two assessments:
  - Group A = Two sites covered in class for girths OR bone diameters (sites and girths/diameters will both be randomly determined, AND
  - Group B = Spirometry (Collins spirometer)
- ! A 20 minute test session will be scheduled; all assessments must be completed in this time period.
- ! After a student is tested, he/she will serve as the client for the next individual and should be dressed appropriately. If there is no test immediately before, the student being tested must bring a client. The client may NOT be a class member unless he/she has been tested.
- ! Grades will be based on ability to: (a) give accurate and complete instructions to participant, (b) administer test correctly and obtain accurate data. **Calculations are not required during the laboratory practical.**
- ! During the practical exam, students who realize they have made an error should correct the error. (It's better to correct an error than to hope/think it will be undetected. Proficiency in testing includes recognizing your errors.)
- ! When administering a test, collect only the measurements necessary to obtain accurate data. You do not need to fill in every blank on the data sheet.
- ! Grading:
  - A (+,-) = No errors or very minor errors, technique & data are good
  - B (+,-) = Some errors, needs additional practice, but data are good
  - C (+,-) = Significant errors, needs correction and practice
  - D (+,-) = Poor technique, accuracy of data is highly questionable
  - F = Unable to obtain data without significant help, or data are invalid

## **Quizzes & Written Midterm Exam**

- ! Quizzes and exams will cover theoretical background, use of equipment, data collection and interpretation.
- ! Questions may include true-false, multiple choice, short answer, problems, and calculations.
- ! The highest four quiz scores will be counted.

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 exam must be completed before the next class meeting. All requests for make-up exams will be evaluated on an individual basis.

### Calculating Grades (Part 1 of course)

97 - 100% = A+ (100%)	93 - 96% = A (95%)	90 - 92% = A- (91%)
87 - 89% = B+ (88%)	83 - 86% = B (85%)	80 - 82% = B- (81%)
77 - 79% = C+ (78%)	73 - 76% = C (75%)	70 - 72% = C- (71%)
67 - 69% = D+ (68%)	63 - 66% = D (65%)	60 - 62% = D- (61%)
Below 60% = F (50%)		

#### Example

Component	% Earned	X	Points Possible	Points
Competency Tests	B, 85%, A, 95%, A, 95%, A, 95%, A, 95%	X	10	9.3
	Avg = 93%			
Professionalism	90%	x	5	4.5
Anthropometric Lab	90%	x	5	4.5
BIA Lab	94%	x	5	4.7
Skinfold Lab	82%	x	5	4.1
Hydrostatic Lab	85%	x	5	4.3
Bod Pod Lab	90%	x	5	4.5
Pulmonary Lab	75%	x	5	3.8
Trifit Lab	95%	x	5	4.8
Body Comp. Project	92%	x	13	12.0
Quizzes	Avg = 82%	x	12	9.8
Lab Practical Exam	A- 91%, B+, 88%	x	10	9.0
	Avg = 89.5%			
Written Midterm Exam	86%	X	15	12.9
Total for Part 1 of course				88.2 B+
88.2 out of 100 pts converted to 44.1 out of 50 pts for Part 1 of course				
50 pts possible in Part 1 (exercise physiol); 50 pts possible in Part 2 (biomechs)				



## PROPOSED SCHEDULE

(Subject to change with fair notice –any changes will be announced in class)

DATE	TOPIC	TEXT ASSIGNMENT	DUE
Mon., Aug. 24	Lec: Introduction & Course Overview, Body Composition Assessment Lab: Anthropometric Measurements (Height, Weight, Girths, Diameters)	Chap. 5	
Wed., Aug. 26	Lab: Anthropometric Measurements (Height, Weight, Girths, Diameters)	Chap. 1	
Mon., Aug. 31	Lec: Skinfold Measurements Lab: Skinfold Measurements	Chaps. 2, 4	
Wed., Sept. 2	Lab: Skinfold Measurements & BIA <b>QUIZ 1</b> (Anthropometric Measurements)		CT: Height & Weight
Mon., Sept. 7	<b>LABOR DAY HOLIDAY</b>		
Wed., Sept. 9	Lab: Bioelectric Impedance Analysis (BIA)	Chaps. 6, 10	Anthropometric Lab
Mon., Sept. 14	Lec: Hydrostatic Weighing <b>QUIZ 2</b> (BIA & Skinfolds) Lab: Hydrostatic Weighing & Residual Volume	pp. 27-33 Chap. 15	
Wed., Sept. 16	Lab: Hydrostatic Weighing & Residual Volume		BIA & Skinfold Labs
Mon., Sept. 21	Lec: Air Displacement Plethysmography <b>QUIZ 3</b> (Hydrostatic Weighing & RV) Lab: Bod Pod	pp. 33-47 Chap. 11	
Wed., Sept. 23	Lab: Bod Pod		Hydrostatic Weighing Lab
Mon., Sept. 28	Lec: Environmental Conditions & Pulmonary Function <b>QUIZ 4</b> (Air Displacement Plethysmography) Lab: Spirometry		CT: Skinfolds
Wed., Sept. 30	Lab: Spirometry		Bod Pod Lab

DATE	TOPIC	TEXT ASSIGNMENT	DUE
Mon., Oct. 5	Lec: Health & Fitness Assessments <b>QUIZ 5</b> (Environ. Conditions & Spirometry) Lab: Trifit System & Cholestech		CT: P <sub>bar</sub>
Wed., Oct. 7	Lab: Trifit System & Cholestech		Body Comp Project CT: Hydrostatic Weighing
Mon., Oct. 12	Lec: Review Lab: <b>Lab Practicals</b>		Spirometry Lab
Wed., Oct. 14	Lab: <b>Midterm (Written)</b>		Trifit Lab
<p>Readings from Heyward &amp; Wagner text</p> <p>CT: Date for completion of first attempt at competency test</p> <p>In addition to the text assignments, students should read the appropriate sections of the course reader BEFORE class.</p>			

**Dr. Plato's furlough days:**

Thursday, August 27  
Thursday, September 17  
Tuesday, September 22 (university-designated)  
Monday, October 19 (university-designated)  
Monday, October 26  
Friday, November 13 (university-designated)  
Monday, November 16  
Wednesday, November 25  
Monday, November 30