

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

**KIN 154B – ECG Interpretations & Graded Exercise Testing
Sections 1 & 2 – Fall 2018**

Course and Contact Information

Instructor:	Peggy Plato, Ph.D.
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Office Hours:	TR 12:00-1:30 pm; other times available by appointment
Class Days/Time:	TR 9:30 am -11:20 am
Classroom:	YUH 233
Prerequisites:	KIN 70 & KIN 155 with grades of C- or better, Human Physiology, Introductory Chemistry, GE Math Current CPR certification – completed before end of semester (hands-on training with card required)

Course Format

This is a lecture-laboratory course. The lecture is scheduled from 9:30-10:20 and the laboratory from 10:30-11:20; however, the lecture will be longer on some days with less laboratory time. Other days, the lecture will be shorter with primarily laboratory activities. The class uses a partially flipped classroom format. Students are expected to read the assigned material and complete pre-lecture questions on Canvas before the material is discussed in class.

Course Description

Theoretical background and practical proficiency in the methods and instruments of electrocardiogram (ECG) interpretation and graded exercise testing (GXT).

Learning Outcomes

Kinesiology Undergraduate Major Program Learning Outcomes (KIN PLOs)

At the end of a Bachelor of Science degree program in the Department of Kinesiology, students will be able to:

- PLO 1 explain, identify, and/or demonstrate the theoretical and/or scientific principles that can be used to address issues or problems in the sub-disciplines in kinesiology.
- PLO 2 effectively communicate in writing (clear, concise and coherent) on topics in kinesiology.
- PLO 3 effectively communicate through an oral presentation (clear, concise and coherent) on topics in kinesiology.
- PLO 4 utilize their experiences across a variety of health-related and skill-based activities to inform their scholarship and practice in the sub-disciplines in kinesiology.

PLO 5 identify and analyze social justice and equity issues related to kinesiology for diverse populations.

Course-Specific Learning Outcomes (CLOs)

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

- CLO 1 demonstrate knowledge of cardiac anatomy and physiology.
- CLO 2 demonstrate knowledge and proficiency in ECG interpretation, including identification of dysrhythmias, and AV and bundle branch blocks.
- CLO 3 demonstrate understanding of the effects that axis changes of depolarization; hypertrophy of the heart; and myocardial ischemia, injury, and infarctions have on the ECG.
- CLO 4 understand and apply guidelines for evaluation of health status prior to GXT and exercise programming, including identifying abnormalities and conditions that are contraindications for GXT and/or exercise.
- CLO 5 demonstrate understanding of the benefits and risks associated with exercise, and legal issues related to exercise testing and programming.
- CLO 6 identify and describe safe endpoints for GXTs.
- CLO 7 understand and identify normal and abnormal GXTs, as well as false positive and false negative tests.
- CLO 8 demonstrate knowledge and proficiency in graded exercise testing methods, instrumentation, and protocols.
- CLO 9 demonstrate an understanding of (and proficiency in) emergency medical procedures that may be necessary during a GXT or exercise session.
- CLO 10 demonstrate an understanding of how data from a GXT reflect current physiological functioning and may be used in exercise programming for healthy individuals.
- CLO 11 demonstrate the ability to explain and interpret ECG and GXT results.
- CLO 12 compare/contrast clinical exercise testing with GXT procedures learned in class.
- CLO 13 demonstrate sensitivity to age, gender, cultural, and other individual differences that may affect the ECG, GXT, and exercise programming.

Required Materials

Textbooks:

Riebe, D. (Ed.). (2018). *ACSM's guidelines for exercise testing and prescription* (10th ed.). Philadelphia: Wolters Kluwer.

Wesley, K. (2017). *Huszar's ECG and 12-lead interpretation*. (5th ed.). St. Louis: Elsevier.

Course Reader: After classroom delivery, available at Maple Press (330 S. 10th St. #200, 408-297-1000)

Other Materials:

Calculator

Metric ruler

ECG calipers (optional)

Course Requirements and Assignments

Success in this course is based on the expectation that students will spend, for each unit of credit, a minimum of 45 hours over the length of the course (normally 3 hours per unit per week) for instruction, preparation/studying, or course-related activities, including labs.

Grading Policy

Evaluation

	CLO	KIN PLO	Weighting
Clinical Assignment*	12, 13	1	5%
Self-Assessment: Resting & Submaximal Exercise*	2, 4, 11	1, 2, 4	6%
Self-Assessment: GXT*	2, 11	1, 2, 4	7%
Exercise Programming Case Study*	10, 13	1, 2	4%
Client Assessment*	2, 4, 10, 11, 13	1, 2	12%
Competency Tests*	8	1	10%
GXT Tasks*	8	1	3%
Pre-Lecture Questions	2, 3	1	8%
Competency Administering Client Assessment*	6, 8	1, 3	3%
Quizzes	1-7, 11	1	12%
Midterm Exam – Thurs., Oct. 11	1-7, 11	1	15%
Final Exam (comprehensive) Mon., Dec. 17, 9:45-12:00	1-7, 9, 11	1	15%

* Instructions and data sheets are in the course reader.

Written Projects (Clinical Assignment, Self-Assessments, Client Assessment, Exercise Programming Case Study)

Guidelines for projects are in the course reader. Written work, other than data sheets, must be typed, double spaced, and proofread. (Check for grammar, spelling, and syntax -- if in doubt, look it up!) Grades will be lowered for late assignments as follows:

Due Date	Received	Grade Lowered
Tuesday	After class Tues. through Wed.	1 grade step (e.g., A minus to B plus)
	Thurs. through Fri.	2 grade steps (e.g., A minus to B)
	Sat., Sun., or following Mon.	1 full grade (e.g., A minus to B minus)
Thursday	After class Thurs. through Fri.	1 grade step
	Sat., Sun. or Mon.	2 grade steps
	Following Tues. or Wed.	1 full grade
Students must speak with the instructor regarding assignments that are more than 1 week late.		

Competency Tests

Students will demonstrate proficiency in the following:

- Measuring resting blood pressure
- Measuring blood pressure during leg (cycle) ergometry
- Measuring blood pressure during treadmill walking
- Placing electrodes for a 12-lead ECG
- Checking calibration of treadmill speed and elevation
- Calibrating a Monark bicycle ergometer

Grading on competency tests: A (95%) = excellent technique
B (85%) = good technique, minor corrections needed
F (50%) = poor or weak technique, significant errors, questionable data
0 pts = did not attempt competency

Students receiving less than an A grade will receive feedback about errors and may, after further practice, re-attempt the competency on another day. If a student does not attempt a competency by the first deadline date, the grade may be lowered one letter grade for each week, or part of a week, that the deadline is missed.

Students are responsible for scheduling competency tests during the lab by signing up on the whiteboard when ready to perform the competency. Tues., Dec. 4 is the last day to complete competency testing.

GXT Tasks

Students will be signed off after competently completing each of the following tasks:

- Administering GXT (start to finish)
- Calibrating metabolic cart
- Prepping client for testing, including ECG
- Obtaining blood pressure during exercise testing
- Obtaining RPE during exercise testing

Grading on GXT Tasks: 5 tasks completed = 3.0 points
4 tasks completed = 2.5 points
3 tasks completed = 2.0 points
2 tasks completed = 1.5 points
1 tasks completed = 1.0 points
0 tasks completed = 0 points

Competency Administering Client Assessment

Students will demonstrate proficiency in administering their clients' GXTs, including:

(a) evaluating medical history prior to assessment day, (b) providing instructions to client and obtaining informed consent, (c) prepping client for testing, (d) obtaining resting measurements, (e) deciding on protocol prior to assessment day, (f) obtaining appropriate measurements during GXT, (g) supervising cool down, (h) administering GXT in a safe and efficient manner, and (i) leaving laboratory and equipment clean after GXT.

Pre-Lecture Questions

Pre-lecture questions will be completed online in Canvas. The questions **MUST** be completed before 6:00 am on the due date. Each set of pre-lecture questions will open at 6:00 pm. If due on a Tuesday, the questions will be available from 6:00 pm on the preceding Thursday until 6:00 am on Tuesday. If due on a Thursday, the questions will be available from 6:00 pm on the preceding Saturday until 6:00 am on Thursday. There is **no** make-up or second chance to complete the pre-lecture questions, so **plan accordingly!** If you start early enough, you will have options if there are technological problems (e.g., on-campus computers if your computer breaks or you have internet connection problems). If you wait until the last minute and there are technological problems, accept the consequences without complaint. The lowest score on the pre-lecture questions will be dropped. Pre-lecture questions are to be completed independently – NOT with another person or in a group. You may use your textbook or other non-human resources; however, the textbook will be the source for correct responses. **Carefully read the University Academic Integrity Policy**

F15-7 at <http://www.sjsu.edu/senate/docs/F15-7.pdf>. Violations will be reported with appropriate sanctions taken. Earning your college degree is important -- think carefully before jeopardizing your degree!

Quizzes

Quizzes will cover lecture and reading material. A scantron 815E and #2 pencil are required for each quiz. The lowest quiz score will be dropped. In most cases, make-up quizzes will not be permitted; however, decisions will be made on an individual basis with advance notification. If a make-up is permitted, it must be completed before the next class meeting.

Midterm & Final Exams

A scantron 882E and #2 pencil are required for the midterm and final exams. Exams may include true-false, multiple choice, matching, and short answer questions and problems. Exams are to be taken on the dates scheduled. The final exam will NOT be given early. 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.

Grading

Grading is based on percentage of total points earned as follows:

97-100%	A plus	93-96%	A	90-92%	A minus
87-89%	B plus	83-86%	B	80-82%	B minus
77-79%	C plus	73-76%	C	70-72%	C minus
67-69%	D plus	63-66%	D	60-62%	D minus
Below 60%			F		
Values used when converting letter grades to percentages:					
98%	A plus	95%	A	91%	A minus
88%	B plus	85%	B	81%	B minus
78%	C plus	75%	C	71%	C minus
68%	D plus	65%	D	61%	D minus
50% or below			F		

Example

Component	% Earned	%	X	Points Possible	=	Points Earned	
Clinical Assignment	90%	.90	X	5	=	4.50	
Self-Assessment: Resting & Submax Exercise	83%	.83	X	6	=	4.98	
Self-Assessment: GXT	82%	.82	X	7	=	5.74	
Exercise Programming	86%	.86	X	4	=	3.44	
Client Assessment	90%	.90	X	12	=	10.80	
Competency Tests	95%	.95	X	10	=	9.50	
GXT Tasks	100%	1.00	X	3	=	3.00	
Competency-Client Assmt.	90%	.90	X	3	=	2.70	
Pre-Lecture Questions (avg %)	88%	.88	X	8	=	7.04	
Quizzes (average %)	82%	.82	X	12	=	9.84	
Midterm Examination	78%	.78	X	15	=	11.70	
Final Examination	90%	.90	X	15	=	13.50	
						86.74	
						Grade: B+	

Classroom Protocol

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

- **Be fully prepared; actively and enthusiastically participate** in ALL lecture/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 course syllabus and 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 assist other students with practice sessions and testing.
- **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 is allowed in the lab; covered drinks only.
- Silence cell phones during class. Use electronic equipment **ONLY** for class activities (e.g., note taking). Texting, scanning the internet, and checking e-mail during class are unprofessional, disrespectful, and distracting to others.

Students who consistently demonstrate professionalism, as described above, **WILL** be able to complete all lab activities 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. Borderline grades may be raised or lowered depending upon student's professional commitment.

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.

Maximal testing must be supervised by ACSM certified personnel (exercise test technologist, certified clinical exercise physiologist, or RCEP).

University Policies

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

Some of this information is excerpted below.

- **Dropping and Adding:** August 31 is the last day to drop this course without a “W” being assigned. According to University policy, dropping this course after Aug. 31 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 is Sept. 10. However, students who receive add codes should use them within 24 hours, or the class space and add code may be given to another student.
- **Consent for Recording of Class and Public Sharing of Instructor Material:** You must obtain the instructor’s permission to make audio or video recordings in this class. Such permission allows the recordings to be used for your private, study purposes only. The recordings are the intellectual property of the instructor; you have not been given any rights to reproduce or distribute the material. You may not publicly share or download/upload instructor-generated material for this course such as quiz and exam questions or lecture notes without instructor consent.
- **Your commitment, as a student, to learning is evidenced by your enrollment at San Jose State University.** The [University Academic Integrity Policy F15-7](#) requires 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. Visit the [Student Conduct and Ethical Development](#) website for more information.

You will be working with other students to collect data and develop competency in exercise testing-related tasks. You are encouraged to discuss material with other students to enhance your understanding. However, assignments that are submitted **MUST** be your own work. Do **NOT** send part or all of your assignment to others. By doing this, you lose control over your work and leave yourself open to cheating and violations of the academic integrity policy.

“The University emphasizes responsible citizenship and an awareness 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. University degrees are compromised and the public is defrauded if faculty members or students knowingly or unwittingly allow dishonest acts to be rewarded academically.”
(Academic Senate Policy S15-7)

- **Campus Policy in Compliance with the Americans with Disabilities Act:** Students who need course adaptations or accommodations because of a disability should notify the instructor as soon as possible.

**KIN 154B – ECG & GXT, Fall 2018
PROPOSED SCHEDULE**

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

Date	Topic	Reading Assignments
Tues., Aug. 21	Introduction & course overview, cardiac anatomy & physiology	
Thurs., Aug. 23	Cardiac anatomy & physiology, resting blood pressure	Wesley - Chap. 1 ACSM - pp. 53-55 CR - Assessing BP
Tues, Aug. 28	Benefits and risks associated with exercise, health screening & risk stratification Pre-lecture questions 1 (Benefits and risks of exercise, health screening & risk stratification) QUIZ #1 (Cardiac anatomy & physiology)	ACSM- Preface, Chaps. 1,2 (delete risk stratification for patients in cardiac rehab)
Thurs., Aug. 30	Health screening & risk stratification (con't) Exercise blood pressure	
Tues., Sept. 4	Submaximal exercise testing, contraindications, informed consent, pretest instructions Treadmill & bicycle operation & calibration Pre-lecture questions 2 (Submaximal exercise testing, contraindications, informed consent, pretest instructions) QUIZ #2 (Benefits & risks of exercise, health screening & risk stratification, resting BP)	ACSM – pp. 44-50, 61-62, 66-69, 79-94, 117-119 CR - Bicycle & treadmill calibration
Thurs, Sept. 6	Electrode placement, ECG leads Pre-lecture questions 3: Electrode placement, ECG leads	Wesley – Chap. 2 (skip modified chest leads) & pp. 174-183 (skip right-sided chest leads) ACSM – Tables C.1 & C.2
Tues., Sept. 11	Components of the ECG Pre-lecture questions 4 (Components of the ECG) QUIZ #3 (Submaximal exercise testing, contraindications, informed consent, pretest instructions) COMPETENCY TEST: Resting BP	Wesley – Chap. 3 ACSM – Table C.4
Thurs., Sept. 13	ECG interpretation Pre-lecture questions 5 (ECG interpretation)	Wesley - Chap. 4 ACSM – Table C.3

Date	Topic	Reading Assignments
Tues., Sept. 18	ECG interpretation (con't) QUIZ #4 (Electrode placement, ECG leads, components of the ECG)	
Thurs., Sept. 20	Measuring VO ₂ , metabolic cart, emergency management, GXT Pre-lecture questions 6 (Measuring VO ₂ , emergency management, graded exercise testing)	ACSM –pp. 81-82, 111-126, Appendix B CR – Sartor et al., 2013
Tues., Sept. 25	Sinus rhythms, GXT Pre-lecture questions 7 (Sinus rhythms) QUIZ #5 (ECG interpretation) COMPETENCY TEST: Electrode placement	Wesley - Chap. 5
Thurs., Sept. 27	Sinus rhythms, GXT COMPETENCY TEST: Exercise BP (cycle or treadmill) DUE: Self-Assessment: Resting & Submaximal Exercise	
Tues., Oct. 2	Atrial rhythms, GXT Pre-lecture questions 8 (Atrial rhythms) QUIZ #6 (Sinus rhythms)	Wesley - Chap. 6
Thurs., Oct. 4	Atrial & junctional rhythms, GXT	Wesley - Chap. 7
Tues., Oct. 9	Catch-up & review	
Thurs., Oct. 11	MIDTERM EXAM	
Tues., Oct. 16	Data interpretation, exercise programming Pre-lecture questions 9 (Data interpretation, exercise programming)	ACSM – pp. 126-134,143-161, 172-173 CR – Blair CR - Skinner & McLellan, 1980
Thurs., Oct. 18	Exercise programming, GXT DUE: Self-Assessment: GXT	
Tues., Oct. 23	Behavior change, GXT Pre-lecture questions 10 (Behavior change) QUIZ #7 (Data interpretation, exercise programming)	ACSM - Chap. 12
Thurs., Oct. 25	Ventricular rhythms, mean QRS axis, GXT Pre-lecture questions 11 (Ventricular rhythms)	Wesley - Chap. 8 & pp. 183-196, Appendix A (Method D, 6-lead method) ACSM – Table C.7

Date	Topic	Reading Assignments
Tues., Oct. 30	Ventricular rhythms, GXT QUIZ #8 (Behavior change) COMPETENCY TEST: Treadmill or bike calibration	
Thurs., Nov. 1	Coronary heart disease & the ECG, GXT Pre-lecture questions 12 (Coronary heart disease & the ECG) DUE: Exercise Programming Case Study	Wesley - Chaps. 15 & 16 ACSM – Table C.6
Tues., Nov. 6	Coronary heart disease & the ECG (con't), GXT QUIZ #9 (Ventricular rhythms)	
Thurs., Nov. 8	AV blocks, GXT DUE: Clinical Assignment Pre-lecture questions 13: AV blocks	Wesley - Chap. 9 ACSM – Tables C.8 & C.9
Tues., Nov. 13	AV blocks, GXT QUIZ #10 (Coronary heart disease & the ECG)	
Thurs., Nov. 15	Bundle branch blocks, GXT Pre-lecture questions 14: Bundle branch blocks	Wesley – Chap. 13 (skip hemiblocks & fascicular blocks)
Tues., Nov. 20	Bundle branch blocks, GXT QUIZ #11 (AV blocks) DUE: Client Assessment, GXT Tasks Completed	
Thurs., Nov. 22	THANKSGIVING HOLIDAY	
Tues., Nov. 27	Cardiac enlargement Pre-lecture questions 15 (Cardiac enlargement) QUIZ #12 (Bundle branch blocks)	Wesley – pp. 212-217 ACSM – Table C.5 CR – deJong, 2011
Thurs., Nov. 29	Clinical exercise testing, exercise testing with imaging, sensitivity & specificity, legal issues	ACSM - pp. 135-139 CR – Ashley & Myers, 2003 CR - Nuclear imaging; CR – Eickhoff-Shemek, 2013
Tues., Dec. 4	Catch-up & summary Last Day to Complete Competency Tests	
Thurs., Dec. 6	Review	
Mon., Dec. 17 9:45 -12:00	FINAL EXAM	

CR = Course Reader