Glendale Unified School District

High School

December 12, 2017

Department:	Career Technical Education
Course Title:	Sports Medicine (course revision)
Course Code:	5162/5163
Grade Level(s):	10, 11
School(s) Course Offered:	Crescenta Valley High School
Course Credits:	10
Length of Course:	Full Year
Recommended Prerequisite:	Completion of Medical Biology
Recommended Textbook:	Sports Medicine Essentials/Jim Clover (2007)
Course Overview:	Sports Medicine 1-2 is concentration course for the Health Science and Medical Technology Industry sector and Patient care pathway. This full-year CTE and Science standard based course is designed to incorporate and expand upon the essential knowledge learned during the student's biology course. It will explore the science components of sport and exercise including biomechanics, exercise physiology, psychology, nutrition, & performance techniques. It will also include the specifics of sports medicine with the exploration of therapeutic careers, medical terminology, anatomy & physiology as it relates to sport and injury, kinesiology, detailed evaluation skills, firstaid competencies, the healing process, injury prevention, rehabilitation techniques, and therapeutic modalities.Multiple laboratory activities and scholarly article reviews are integrated as essential aids in the learning process to extend the students comprehension and application of the current technology and information associated with the science. A compilation of work and competencies will be required to be kept by each student that will develop and build as the course progresses.

Course Content:

Semester 1

Unit 1: Introduction (1 week)

Standards:

Health Science and Medical Technology
Anchor Standard 3.1, 3.4, 10.1, 10.2
Patient Care Pathway
Standard B5.1, B5.2, B5.4, B5.5
CCSS LS 11-12.1, 11-12.4, 11-12.6, WHSST 11-12.2, 11-12.4, RRLST 11-12.1, LS1.B, PS1.A, PS1.B

1. Students will integrate the history and advancement of medicine and explore the variety of therapeutic and exercise science careers. Proper medical terminology will be learned and put together with understanding the kinesiology of anatomical planes, positions, directional terms and movements. This knowledge will continually be reinforced throughout the class. Legal and ethical concerns will be reviewed in relation to appropriate treatment, documentation and legislation.

2. a. The student's will be investigating a career field related to sports medicine or exercise science and evaluated with a research paper and presentation to the class with specific areas such as education, setting, salary, job skills, continuing education, etc… being reviewed. During each semester, the students will be required to do 10 hours (20 total) of observation within the sports medicine or exercise science field and conclude with a paper describing their observations and experience.
b. Students will learn and prepare proper SOAP and HIPS notes for documentation using combining knowledge and diff erentiation of subjective and objective findings with proper medical terminology.

Unit 2: Body system, Prevention, and First-Aid (2 weeks)

Standards:

Health Science and Medical Technology
Anchor Standard 6.2, 6.4, 6.6
Patient Care Pathway
Standard B11.1, B11.2, B11.3, B11.4
CCSS LS 11-12.1, 11-12.4, 11-12.6, WHSST 11-12.2, 11-12.4, RRLST 11-12.1, LS1.B

1. Students will learn normal physiology and homeostasis of the body systems with blood pressure, body temperature, and respiration rate and medical evaluation included in preparticipation medical evaluation. The eff ects of trauma to the body systems will be reviewed and connected with primary and secondary survey assessments of injury and treatment. The

science and effectiveness of CPR and AED will be taught along with specific laws associated with treatment and use. Other emergency situations including bleeding, fractures, and shock will be looked at as well as blood borne pathogens and OSHA standards and connected with appropriate treatment to maintain body homeostasis for survival. The students will also be educated on the current technology, purpose and proper fitting of protective gear and associated studies for the prevention of injury.

2. a. The student's knowledge of primary and secondary survey and treatment will be evaluated through American Heart Association CPR/AED and First-Aid certification. This includes carrying out a primary and secondary survey of a patient and actual performance of CPR and first-aid skills.

2. b. Students will be assessed on hands-on performance skills for taking blood pressure, pulse, respiration rate and temperature with documentation and comparison of normative values to causes of abnormal values.

Unit 3: Tissue Response to Injury, Healing & Regeneration (3 weeks)

Standards:

Health Science and Medical Technology
Anchor Standard 10.1, 10.2, 10.3
Patient Care Pathway
Standard B2.1, B2.2, B2.3
CCSS LS 11-12.1, 11-12.4, 11-12.6, WHSST 11-12.2, 11-12.4, RRLST 11-12.1, LS1.B, PS1.A, PS1.B

1. Students will review normal tissue structure and function and learn the response of that tissue to physical injury. Soft tissue trauma, bony trauma and nerve trauma will be compared with healing and regeneration times and various classifications of injury. A connection will be made between biomechanical forces and the different injuries caused. The physiology of the inflammatory response and pain-spasm-pain cycle will be connected to the GATE control theory and therapeutic modality and pharmacology treatment options including cryotherapy, thermotherapy, electrical stimulation, NSAIDs, and others.

2. a. Students will need to identify and classify the different types of trauma including soft tissue with degrees of trauma and boney trauma with types of fractures. Students will need to maintain proper medical terminology as learned previously in their identification.

2. b. Students will map out or chart the physiological response to injury with the inflammatory process and possible effects of various therapeutic modalities.

Unit 4: Lower Extremity (6 weeks)

Standards

Health Science and Medical Technology

Anchor Standard 2.5, 5.1, 10.1, 10.3
Patient Care Pathway
Standard B2.1, B2.2, B2.3, B2.4
CCSS LS 11-12.1, 11-12.4, 11-12.6, WHSST 11-12.2, 11-12.4, RRLST 11-12.1, LS1.B

1. Education associated with content specifically regarding the foot, ankle, and lower leg; knee and thigh; and hip will be learned building upon knowledge previously learned with the injury healing process and continually maintaining proper medical terminology. The anatomy and physiology of the bones, muscles, tendons, and ligaments will be instructed including topography, origins and insertions. This information will be connected with the kinesiology of body movement progressing to injuries and mechanisms and further connecting this to treatment techniques as learned in previous units, tissue reeducation and rehabilitation.

2. a. Students will be measured through hands-on palpation of detailed anatomical structures and evaluation including orthopedic special tests. They will combine the information gained with the signs and symptoms presented and their knowledge of specific injuries to conclude with identification of injury prognosis. This will be documented with a full analysis report including subjective, objective, and special test findings concluding with an assessment and plan for treatment.

2. b. Competency of treatment will be examined through treatment and rehabilitation techniques including taping and therapeutic exercise skills associated with specific lower extremity injuries. This will be tested through hands-on laboratory skill evaluation as well as written rehabilitation plan progression with emphasis on specific correlation of treatment to expected outcome.

Unit 7: Head and Face (4 weeks)

Standards:

Health Science and Medical Technology
Anchor Standard 2.5, 5.1, 10.1, 10.3
Patient Care Pathway
Standard B2.1, B2.2, B2.3, B2.4
CCSS LS 11-12.1, 11-12.4, 11-12.6, WHSST 11-12.2, 11-12.4, RRLST 11-12.1, LS1.B

1. Information associated with content regarding the head, face and brain will be learned. The anatomy and physiology of the bones and muscles will be taught including topography, origins and insertions. This information will be connected with injuries and mechanisms with further connection to treatment techniques. The brain topography and functions as well as cranial nerves will be reviewed. In addition, the biomechanics of head injury and concussion will be examined including the neurometabolic cascade of concussion in connection to long term effects and appropriate treatment.

2. Key Assignments

Students will physically perform concussion clinical/laboratory baseline assessments using IMPACT, BESS, SAC, and SCAT3 evaluations. They will be evaluated on their knowledge of head injuries with the documentation of a head injury report with a treatment plan designed to include return to learn and return to play protocols with emphasis following CA State Laws, Ed Code and CIF, NCAA, or NFL guidelines.

Unit 8: Environmental Considerations (2 weeks)

Standards:

Health Science and Medical Technology
Anchor Standard 10.1, 10.2, 10.3
Patient Care Pathway
Standard B1.1, B1.2, B1.4, B1.5
CCSS LS 11-12.1, 11-12.4, 11-12.6, WHSST 11-12.2, 11-12.4, RRLST 11-12.1, LS1.B

1. The various effects of the environment and their relationship to performance and possible injuries or conditions will be studied. Hyperthermia and hypothermia issues as they relate to metabolic production, conductive, convective and radiant exchange and evaporation will be examined. This information will be combined with the heat index and the signs and symptoms of both cold and heat illness conditions as well as prevention and treatment. The physiological effects and adaptation to altitude and its connection to training and performance will be considered in relation to current methods and evidence based studies. Other areas will also be discussed including circadian dysrhythmia, air pollution levels, and lightning safety.

2. Key Assignments
Students will be evaluated on their knowledge of relative humidity with laboratory measurements using a wet-bulb-globe temperature gauge and charting this information with the heat index levels and appropriate training levels.

Optional: The students will have the opportunity to assess their own physiological effects of altitude with use of an altitude training tent. The findings would be documented and charted with a final presentation to the class.

<u>Semester 2</u>

Unit 5: Trunk and Spine (4 weeks)

Standards:

Health Science and Medical Technology
Anchor Standard 2.5, 5.1, 10.1, 10.3
Patient Care Pathway
Standard B2.1, B2.2, B2.3, B2.4
CCSS LS 11-12.1, 11-12.4, 11-12.6, WHSST 11-12.2, 11-12.4, RRLST 11-12.1, LS1.B

1. Education associated with content specifically regarding the trunk and spine will be learned building upon knowledge previously learned with the injury healing process and continually maintaining proper medical terminology. The anatomy and physiology of the bones, muscles, tendons, and ligaments will be instructed including topography, origins and insertions. This information will be connected with the kinesiology of body movement progressing to injuries and mechanisms and further connecting this to treatment techniques as learned in previous units, tissue reeducation and rehabilitation. Focus will include the organs and their functions and injuries and diseases or conditions associated with them as well as the nerve function, healing and current studies, experimentation, and advancements with spinal cord injury.

2. a. Proper identification and hands-on palpation of the abdominal quadrants and the organs associated with their locations in a clinical/laboratory setting will be assessed as well as proper nerve function through reflex testing. The findings will be combined with the student's knowledge of anatomy and signs and symptoms associated with specific injuries and concluded with possible diagnosis. The students will document their findings with subjective and objective information and project a conclusion and necessary treatment plan.

Unit 6: Upper Extremity (6 weeks)

Standards:

Health Science and Medical Technology
Anchor Standard 2.5, 5.1, 10.1, 10.3
Patient Care Pathway
Standard B2.1, B2.2, B2.3, B2.4
CCSS LS 11-12.1, 11-12.4, 11-12.6, WHSST 11-12.2, 11-12.4, RRLST 11-12.1, LS1.B

1. Education associated with content specifically regarding the shoulder; upper arm, forearm, and elbow; and wrist and hand will be learned building upon knowledge previously learned with the injury healing process and continually maintaining proper medical terminology. The anatomy and physiology of the bones, muscles, tendons, and ligaments will be instructed including topography, origins and insertions. This information will be connected with the kinesiology of body movement progressing to injuries and mechanisms and further connecting this to treatment techniques as learned in previous units, tissue reeducation and rehabilitation.

2. a. Students will be measured through hands-on palpation of detailed anatomical structures and clinical evaluation including orthopedic special tests. They will combine the information gained with the signs and symptoms presented and their knowledge of specific injuries to conclude with identification of injury prognosis. This will be documented with a full analysis report including subjective, objective, and special test findings concluding with an assessment and plan for treatment.

2. b. Competency of treatment will be examined through treatment and rehabilitation techniques including taping and therapeutic exercise skills associated with specific upper extremity injuries. This will be tested through hands-on competency skill evaluation as well as

written rehabilitation plan progression with emphasis on specific correlation of treatment to expected outcome.

Unit 9: Performance Physiology (2 weeks)

Standards:

Health Science and Medical Technology
Anchor Standard 2.5, 5.1 10.1, 10.3
Patient Care Pathway
Standard B2.1, B2.2, B2.3, B2.4
CCSS LS 11-12.1, 11-12.4, 11-12.6, WHSST 11-12.2, 11-12.4, RRLST 11-12.1, LS1.B, PS1.A, PS1.B

1. The physiology of the muscles and energy systems will be reviewed. This will include information on actin, myosin and the sliding filament theory and connected with muscle strain injury and preventative stretching treatment. The diff erences in fast-twitch versus slow-twitch muscle fiber will be evaluated in relation to sport demands. The anaerobic and aerobic-oxidative energy systems including the ATP-PC system, glycolytic system, cardiorespiratory system and the physiological eff ects of the heart and lungs will be examined as well as how they can be enhanced through sport science techniques and training.

2. a. The students will perform applied assessments of their own activity as it relates to their heart rate using a heart rate monitor. The information gathered will be recorded, charted, and evaluated by the students. Students will also observe an exercise physiologist performing maximum heart rate and lactate threshold testing, record findings, and review an analysis of the testing results.

Unit 10: Biomechanics (2 weeks)

Standards:

Health Science and Medical Technology
Anchor Standard 2.5, 5.1 10.1, 10.3
Patient Care Pathway
Standard B9.1, B9.3, B9.4
CCSS LS 11-12.1, 11-12.4, 11-12.6, WHSST 11-12.2, 11-12.4, RRLST 11-12.1, LS1.B

1. The laws of mechanics and physics as it relates to sport and performance and the cause-eff ect relationship will be examined using principles such as motion, resistance, momentum and friction. Students will apply this information to the assessment of flexibility as it pertains to range of motion and stretching techniques for enhancement including static, ballistic, and proprioceptive neuromuscular facilitation. Resistance training and methodology for power, speed and endurance training with periodization and proper biomechanical lifting techniques will be taught including diff erences in isometric, isotonic and isokinetic exercises and open versus closed-chain. The principles of SAID, Overload and specificity will be learned in connection with the above physiological and biomechanical factors.Students will learn to assess

normal biomechanical movement as well as biomechanical needs for various sport activity and skills with the use of observation and technology.

2. a. Laboratory assessment of joint range of motion will be learned and evaluated using a goniometer with proper alignment, technique and measurement accuracy. Students will be examined on the application and instruction of proper stretching techniques for prevention of injury with appropriate muscle identification, positioning and methodology.

2. b. Students will learn and perform proper biomechanical techniques for strength training in context to load and power. They will design an annual performance program using the principles learned in relation to their assessment of the biomechanical needs of specific movements for sport skills as well as the connection to the physiological needs associated with the sport.

Unit 11: Nutritional Components (3 weeks)

Standards:

Health Science and Medical Technology
Anchor Standard 2.5, 5.1 10.1, 10.3
Patient Care Pathway
Standard B9.1, B9.2, B9.4
CCSS LS 11-12.1, 11-12.4, 11-12.6, WHSST 11-12.2, 11-12.4, RRLST 11-12.1, LS1.B, PS1.A, PS1.B

1. The physiological effects of nutrition and the production of energy as it relates to various food and supplement sources will be learned. This information will be compared with the energy output of activity and connected to current food labels, pre and post-game meal needs and hydration. Current information and analysis of varying body composition methods and their accuracy will be evaluated. Information regarding eating disorders will be presented along will the efficacy and research related to current fad diets and supplementation. Lastly, ergogenic aids and performance enhancing substances will be looked at in relation to their physiological effects, health effects; high school, NCAA, USADA, and WADA regulations, and current studies.

2. a. Students will record and assess their own personal diet with a 3-day diet analysis and make correlations to intake, needs, deficiencies, and activity level.

2. b. Students will perform research on a variety of medications and performance enhancing substances on usada.org. They will apply this knowledge with the physiological effects of the medications and substances and make a presentation to the class on their findings.

Unit 12: Psychological Factors (2 weeks)

Standards:

Health Science and Medical Technology
Anchor Standard 2.5, 5.1 5.4, 5.6
Patient Care Pathway
Standard B2.1, B2.2, B2.3, B2.4
CCSS LS 11-12.1, 11-12.4, 11-12.6, WHSST 11-12.2, 11-12.4, RRLST 11-12.1, LS1.B

1. The psychological responses to injury and the healing process will be studied and associated as it pertains to the cycle of loss. Other topics such as overtraining, staleness and burnout will be considered in connection with performance. Psychological management techniques such as imagery, positive/negative thinking, and goal setting will be examined as well as the influences of coaches and parents, and the eff ects of stress and anxiety. These are components that can be related to performance as well as daily life for students.

2. a. Students will experience and perform the goal setting process of evaluation of goals and setting of short-term and long-term goals. This process will be clearly presented including objective measures to achieving the goals set.

Additional Recommended Materials:

Sports Medicine Essentials workbook/Jim Clover (2007)