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**Program Concentration:**

**Healthcare Science**

**Career Pathway:**

**Therapeutic Services-Physical Medicine**

**Course Title:**

**Rehabilitation in Physical Medicine**

**Course Description:** Rehabilitation in Physical Medicine is a course for the Therapeutic Medicine-Physical Medicine Career Pathways. It is appropriate for students wishing to pursue a career in the Sports Medicine/Rehabilitative Services Industry. The course will enable students to enhance knowledge of Therapeutic Services skills and attitudes applicable to the healthcare industry through both classroom instruction and hands on laboratory experience. The course introduces basic principles and applications of concepts of gait training, therapeutic exercise, pharmacology and modality and treatment techniques in physical medicine. Mastery of these standards through project based learning, technical skills practice, and leadership development activities of the career and technical student organization -Health Occupations Students of America (HOSA) will provide students with a competitive edge for either entry into the healthcare global marketplace and/or the post-secondary institution of their choice to continue their education and training. This course is considered broad-based with high impact and is a prerequisite for Practicum courses.

## Academic Foundations

**HS –RPM-1: Students will demonstrate knowledge and understanding of the academic subject matter required for proficiency within their area. Academic Standards are integrated throughout the standard statements within their discipline areas and documented immediately following the standard statement.**

## Concepts of Healing

**HS-RPM-2. Students will analyze and describe the basic principles and concepts of healing.**

- a. Define and understand the terminology associated with wound healing.
- b. Distinguish between primary and secondary healing.
- c. Classify and explain the phases of healing.
- d. Identify the chronology of wound and common growth factors in healing.
- e. Describe the healing characteristics of specific tissues.
- f. Discuss factors that affect healing.

### **Academic Standards:**

*SAP 4: Students will analyze the physical, chemical, and biological properties of process systems as these relate to transportation, absorption, and excretion, including the cardiovascular, respiratory, digestive, excretory and immune systems.*

*d. Examine various conditions that change normal body functions (e.g. tissue rejection, allergies, injury, diseases and disorders) and how the body responds.*

## Concepts of Rehabilitation

**HS-RPM-3. Students will analyze and describe the basic principles and concepts of rehabilitation**

- a. Identify the basic guidelines, components, objectives and phases of rehabilitation.
- b. Identify different modalities utilized in rehabilitation.
- c. Describe the relationship among goals, progression and examination.
- d. Outline the importance of outcomes-based rehabilitation.

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- e. Identify and describe goals and objectives of rehabilitation programs .
- f. Evaluate and outline a patient’s progress in rehabilitation and return-to-competition criteria .
- g. Identify the stages of grief and the rehabilitation clinician’s role in assisting the patient through these stages.

## Ideologies of Exercise

**HS-RPM-4. Students will analyze and describe the principles of reconditioning and exercise physiology.**

- a. Distinguish between the difference between anaerobic and aerobic exercise.
- b. Explain the difference between the energy systems to include the immediate, oxidative, and nonoxidative energy systems.
- c. Identify and describe the nutritional considerations for physical activity.
- d. Define pathologies of common diseases that affect physical activity ability.
- e. Describe muscle fiber types and the proper use of each during activity.
- f. Identify and demonstrate types of isotonic, isometric, and isokinetic exercises.
- g. Identify and demonstrate the difference between concentric and eccentric muscle contractions.
- h. Distinguish between open and closed kinetic chain activity.
- i. Identify the various grades of manual muscle testing.
- j. List the Proprioceptive Neuromuscular Facilitation (PNF) techniques commonly used in rehabilitation.

## Basic Principles and Application of Neurology with Physical Medicine

**HS-RPM-5. Students will analyze and describe neurological considerations in physical medicine.**

- a. Identify the function of the central and peripheral nervous systems.
- b. Describe pathologies of the nervous systems to include muscular sclerosis, stroke, and cerebral palsey.
- c. Identify and describe neuromuscular involvement.
- d. Distinguish between myotomes and dermatomes.
- e. Name and perform an assessment of the cranial nerves.
- f. Identify and list the afferent receptors involved in proprioception.
- g. Identify the Central Nervous System sites that relay proprioceptive information to the motor system.
- h. List the ABC’s of proprioception.
- i. Identify the systems that control balance and components of coordination.
- j. Demonstrate the progression of proprioceptive exercises for lower and upper extremities.

### Academic Standards:

*SAP1: Students will analyze anatomical structures in relationship to their physiological functions.*

*a. Apply correct terminology when explaining the orientation of body parts and regions.*

*b. Investigate the interdependence of the various body systems to each other and to the body as a whole.*

*SAP2 : Students will analyze the interdependence of the integumentary, skeletal, and muscular systems as these relate to the protection, support and movement of the human body.*

*a. Relate the structure of the integumentary system to its functional role in protecting the body and maintaining homeostasis.*

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*b. Explain how the skeletal structures provide support and protection for tissues, and function together with the muscular system to make movements possible.*

*SAP 3: Students will assess the integration and coordination of body functions and their dependence on the endocrine and nervous systems to regulate physiological activities.*

*a. Interpret interactions among hormones, senses, and nerves which make possible the coordination of functions of the body.*

*b. Investigate the physiology of electrochemical impulses and neural integration and trace the pathway of an impulse, relating biochemical changes involved in the conduction of the impulse.*

*c. Describe how the body perceives internal and external stimuli and responds to maintain a stable internal environment, as it relates to biofeedback.*

*SCSh8 : Students will understand important features of the process of scientific inquiry. Students will apply the following to inquiry learning practices:*

*a. Scientific investigators control the conditions of their experiments in order to produce valuable data.*

*b. Scientific researchers are expected to critically assess the quality of data including possible sources of bias in their investigations' hypotheses, observations, data analyses, and interpretations.*

*c. Scientists use practices such as peer review and publication to reinforce the integrity of scientific activity and reporting.*

*d. The merit of a new theory is judged by how well scientific data are explained by the new theory.*

*e. The ultimate goal of science is to develop an understanding of the natural universe which is free of biases.*

*f. Science disciplines and traditions differ from one another in what is studied, techniques used, and outcomes sought.*

## **Principles of Functional Exercise**

**HS- RPM-6. Students will demonstrate knowledge and understanding of functional exercise**

- a. Explain the difference between functional exercise and functional testing.
- b. Identify functional exercises that are key to any therapeutic exercise program.
- c. Outline the progression from basic to advanced functional activities.
- d. Identify precautions that must be followed in functional exercises.
- e. List factors that can be altered with a progression of functional activities.
- f. Outline a functional exercise program for both the upper and lower extremities.

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## **Foundations of Posture and Body Mechanics**

**HS- RPM-7. Students will analyze and describe the phases of body mechanics.**

- a. Identify the components of proper alignment in standing from an anterior, posterior, and side view.
- b. List common postural faults and describe their causes.
- c. Outline corrective exercises for common postural faults.
- d. List the basic principles of good body mechanics.
- e. Explain the importance of good posture and body mechanics.

## **Foundations of Proper Gait Mechanics**

**HS-RPM-8. Students will analyze and describe the phases of gait mechanics.**

- a. Identify the phases of gait mechanics to include stance, mid-stance, terminal stance, and swing phase.
- b. Describe the proper body alignment during phases of gait mechanics.
- c. Illustrate proper body alignment during these phases using assisted gait devices such as a cane, walker, or crutches.
- d. Explain the actions of major muscle groups during the different phases of gait mechanics.

## **Principles of Therapeutic Exercise in Physical Medicine**

**HS-RPM-9. Students will analyze and describe the different phases and principles of each phase of rehabilitation, as well as return to activity.**

- a. Distinguish between the phases of rehabilitation including the acute phase, sub-acute phase, and the return to function.
- b. Describe the inflammatory response, Range of Motion (ROM) and restoring ROM, soft tissue healing response, and proper therapeutic exercises for injuries in the acute phase.
- c. Describe the inflammatory response, Range of Motion (ROM) and restoring ROM, soft tissue healing response, and proper therapeutic exercises for injuries in the sub-acute phase.

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- d. Describe the inflammatory response, Range of Motion (ROM) and restoring ROM, soft tissue healing response, proper therapeutic exercises, proper functional testing, concepts and application of plyometrics, and cardiovascular demands for return to activity.

## Applications of Therapeutic Exercise in Physical Medicine

**HS- RPM -10. Students will develop therapeutic exercise programs for each body segment.**

- a. Outline and demonstrate a therapeutic exercise program relative to the neck and back.
- b. Outline and demonstrate a therapeutic exercise program relative to the shoulder.
- c. Outline and demonstrate a therapeutic exercise program relative to the elbow.
- d. Outline and demonstrate a therapeutic exercise program relative to the wrist and hand.
- e. Outline and demonstrate a therapeutic exercise program relative to the knee.
- f. Outline and demonstrate a therapeutic exercise program relative to the ankle.
- g. Outline and demonstrate a therapeutic exercise program relative to the foot.

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*SAP2 : Students will analyze the interdependence of the integumentary, skeletal, and muscular systems as these relate to the protection, support and movement of the human body.*

- a. Relate the structure of the integumentary system to its functional role in protecting the body and maintaining homeostasis.
- b. Explain how the skeletal structures provide support and protection for tissues, and function together with the muscular system to make movements possible.

## Applications of Pharmacology in the Physical Medicine Profession

**HS-RPM-11. Students will analyze and describe the principles of pharmacology.**

- a. Define common over-the-counter (OTC) medications.
- b. Describe the contraindications and indications of common OTCs.
- c. Define legal and illegal supplements and their side effects.
- d. Identify specific prescription medications commonly used after sustaining an injury.
- e. Identify specific prescription medications commonly used as treatment or prevention of common pathologies such as diabetes or heart conditions.

## Principles of Modalities in Physical Medicine

**HS-RPM-12. Students will analyze and describe the appropriate use of therapeutic modalities.**

- a. Describe the physiological effects and considerations in the use of cold and hot therapies.
- b. Describe the physiological effects and considerations in the use of ultrasound therapy.
- c. Describe the physiological effects and considerations in the use of electrotherapy.
- d. Describe the physiological effects and considerations in the use of massage therapy.

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## Reading Across the Curriculum

### Reading Standard Comment

After the elementary years, students engage in reading for learning. This process sweeps across all disciplinary domains, extending even to the area of personal they experience text in all genres and modes of discourse. In the study of various disciplines of learning (language arts, mathematics, science, social studies), students must learn through reading the communities of discourse of each of those disciplines. Each subject has its own specific vocabulary, and for students to excel in all subjects, they must learn the specific vocabulary of those subject areas in context.

Beginning with the middle grades years, students begin to self-select reading materials based on personal interests established through classroom learning. Students become curious about science, mathematics, history, and literature as they form contexts for those subjects related to their personal and classroom experiences. As students explore academic areas through reading, they develop favorite subjects and become confident in their verbal discourse about those subjects.

Reading across curriculum content develops both academic and personal interests in students. As students read, they develop both content and contextual vocabulary. They also build good habits for reading, researching, and learning. The Reading Across the Curriculum standard focuses on the academic and personal skills students acquire as they read in all areas of learning.

Students will enhance reading in all curriculum areas by:

- a. Reading in all curriculum areas
  - Read a minimum of 25 grade-level appropriate books per year from a variety of subject disciplines and participate in discussions related to curricular learning in all areas.
  - Read both informational and fictional texts in a variety of genres and modes of discourse.
  - Read technical texts related to various subject areas.
- b. Discussing books
  - Discuss messages and themes from books in all subject areas.
  - Respond to a variety of texts in multiple modes of discourse.
  - Relate messages and themes from one subject area to messages and themes in another area.
  - Evaluate the merit of texts in every subject discipline.
  - Examine author's purpose in writing.
  - Recognize the features of disciplinary texts.
- c. Building vocabulary knowledge
  - Demonstrate an understanding of contextual vocabulary in various subjects.
  - Use content vocabulary in writing and speaking.

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- Explore understanding of new words found in subject area texts.
- d. Establishing context
  - Explore life experiences related to subject area content.
  - Discuss in both writing and speaking how certain words are subject area related.
  - Determine strategies for finding content and contextual meaning for unknown words.

## **CTAE Foundation Skills**

The Foundation Skills for Career, Technical and Agricultural Education (CTAE) are critical competencies that students pursuing any career pathway should exhibit to be successful. As core standards for all career pathways in all program concentrations, these skills link career, technical and agricultural education to the state's academic performance standards.

The CTAE Foundation Skills are aligned to the foundation of the U. S. Department of Education's 16 Career Clusters. Endorsed by the National Career Technical Education Foundation (NCTEF) and the National Association of State Directors of Career Technical Education Consortium (NASDCTEC), the foundation skills were developed from an analysis of all pathways in the sixteen occupational areas. These standards were identified and validated by a national advisory group of employers, secondary and postsecondary educators, labor associations, and other stakeholders. The Knowledge and Skills provide learners a broad foundation for managing lifelong learning and career transitions in a rapidly changing economy.

**CTAE-FS-1 Technical Skills:** Learners achieve technical content skills necessary to pursue the full range of careers for all pathways in the program concentration.

**CTAE-FS-2 Academic Foundations:** Learners achieve state academic standards at or above grade level.

**CTAE-FS-3 Communications:** Learners use various communication skills in expressing and interpreting information.

**CTAE-FS-4 Problem Solving and Critical Thinking:** Learners define and solve problems, and use problem-solving and improvement methods and tools.

**CTAE-FS-5 Information Technology Applications:** Learners use multiple information technology devices to access, organize, process, transmit, and communicate information.

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**CTAE-FS-6 Systems:** Learners understand a variety of organizational structures and functions.

**CTAE-FS-7 Safety, Health and Environment:** Learners employ safety, health and environmental management systems in corporations and comprehend their importance to organizational performance and regulatory compliance.

**CTAE-FS-8 Leadership and Teamwork:** Learners apply leadership and teamwork skills in collaborating with others to accomplish organizational goals and objectives.

**CTAE-FS-9 Ethics and Legal Responsibilities:** Learners commit to work ethics, behavior, and legal responsibilities in the workplace.

**CTAE-FS-10 Career Development:** Learners plan and manage academic-career plans and employment relations.

**CTAE-FS-11 Entrepreneurship:** Learners demonstrate understanding of concepts, processes, and behaviors associated with successful entrepreneurial performance.