Module (Course Syllabus) Catalogue

2024-2025

College/ Institute	Erbil Technical Health	
Department	**Physiotherapy**	
Module Name	**Physical Therapeutic Modality**	
Module Code		
Semester	**1st. Semester**	
Credits		
Module type	**Prerequisite** ■ **Core** ☐ **Assist.** ☐	
Weekly hours	**12 hours**	
Weekly hours (Theory)	**(2)hr Class**	**(4)hr Workload**
Weekly hours (Practical)	**( )hr Class**	**( )hr Workload**
Lecturer (Theory)	**Dr. Nawroz Ismael Hassan**	
E-Mail & Mobile NO.	nawrozih@epu.edu.iq 009647504989908	
Lecturer (Practical)		
E-Mail & Mobile NO.		

Course Book

Course Description	This protocol is intended as a quick reference for the application of a variety of physical therapy modalities, including cryotherapy, thermotherapy, ultrasound and electrotherapy. Many physical therapy modalities are aimed at controlling pain and/or inflammation. As a general principle, these modalities should be used on a brief and limited basis as part of initial treatment of the acute patient. Once the clinician identifies the desired therapeutic effect (e.g., reduce inflammation, control acute or chronic pain, promote healing), the choice of the modality may well depend on availability, the clinician's preference, and the individual patient's preference and response.
Course objectives	1. Describe the normal sensations perceived in response to the application of a variety of thermal agents through having the agents applied to them by a classmate and recording the sensations. 2. Identify practical application techniques and challenges for thermal agents by participating in problem-solving activities in guided lab activities using physical agents. 3. Describe the available parameters of therapeutic ultrasound devices and the application for each of the parameters based on reported symptoms and patient status. 4. Describe the purpose of the components of a therapeutic whirlpool through the identification, adjustment, cleaning, and use of each of these components. 5. Demonstrate techniques to decrease the stresses on postural muscles so that a traction force may be successfully applied to the cervical musculature. 6. Demonstrate patient positioning for, clinical application of, and removal of an intermittent compression device for edema reduction in the upper and lower extremity.
Student's obligation	1. **Assignments:** - Seminar, - Homework, - Quiz, -report, - Prepare case study (Discussion). 2**. Article Review.** 3. **Exam.**

Required Learning Materials	1. Application techniques for several therapeutic heating agents including: hydrocollator (hot) packs, paraffin, Fluid therapy, shortwave diathermy, and cryotherapy. Student/learners are expected to both receive and administer treatments to their classmates, recording observations from both perspectives as indicated. 2. To familiarize the student/learner with a wide variety of potential application techniques for water to accomplish therapeutic treatment goals. This modality is referred to as hydrotherapy. 3. to demonstrate the principles of therapeutic traction that are currently practiced in clinical environments. Student/learners will become familiar with the treatment goals, positioning, apparatus, and techniques that are commonly employed.
Assessment scheme	50% Assignment (Article review) 50% final
Specific learning outcome:	1- Their Role in the Patient Care Management Model. 2- Identify practical application techniques and challenges for thermal agents by participating in problem-solving activities in guided lab activities using physical agents. 3- Integrate the problem-solving process into the application of therapeutic **heat** for a patient by practicing the techniques with a classmate, discussing outcomes and soliciting feedback. 4- Integrate the problem-solving process into the application of therapeutic **cold** for a patient by practicing the techniques with a classmate, discussing outcomes and soliciting feedback. 5- Describe and apply therapeutic ultrasound to accomplish a specific treatment goal, including the explanation of the treatment to the patient in terms that the patient will understand. 6- Describe physical principles of water and how it can be therapeutically beneficial for a patient.

	7- Demonstrate techniques to decrease the stresses on postural muscles so that a traction force may be successfully applied to the cervical musculature. 8- Demonstrate the adjustment of various parameters on electrical stimulation devices to intentionally elicit sensory, motor, and fast pain responses and accurately document the parameters. 9-Describe several different types of electrodes that can be used for the delivery of electrical stimulation to a patient and demonstrate the application of each for therapeutic purposes. 10- Compare electrical stimulation parameters and electrode placement sites for edema reduction, muscle spasm reduction, and muscle strengthening, and demonstrate each application. 11- Prepare the skin for the application of iontophoresis and predict common skin reactions that follow the application of iontophoresis & Calculate dosage with iontophoresis using common technique
Course References:	1- Modalities for Therapeutic Intervention, **2016** by F. A. Davis Company. 2- Physical Agents Theory and Practice Practical Manual, **2006,** Barbara J. Behrens, PTA, MS. 3- Physical Agents Theory and Practice,**2014** Holly Beinert . 4- Physical Agents in Rehabilitations ,**2018** Elsevier, Michelle H. Cameron**.**

Course topics (Theory)	Week	Learning Outcome
1- ***THERAPEUTIC MODALITIES PAST, PRESENT, AND FUTURE:*** ➢ THERAPEUTIC MODALITIES ROLES IN REHABILITATION. ➢ TYPES OF THERAPEUTIC MODALITIES. ➢ Modalities as Part of the Comprehensive Plan	Week 1	Their **Role** in the Patient Care Management Model.
2- ***COLD THERAPY MODALITIES:*** ➢ PHYSICAL PRINCIPLES. ➢ BIOPHYSICAL PRINCIPLES OF TISSUE COOLING. ➢ CLINICAL INDICATIONS FOR COLD THERAPY. ➢ CONTRAINDICATIONS AND PRECAUTIONS FOR CRYOTHERAPY. ➢ METHODS OF PROVIDING CRYOTHERAPY. ➢ ASSESSMENT OF EFFECTIVENESS AND EXPECTED OUTCOMES.	Week 2	Integrate the problem-solving process into the application of therapeutic **cold** for a patient by practicing the techniques with a classmate, discussing outcomes and soliciting feedback
3- ***THERAPEUTIC HEAT:*** ➢ BIOPHYSICAL EFFECTS OF TEMPERATURE ELEVATION. ➢ PHYSICAL PRINCIPLES OF HEAT. ➢ CLINICAL DECISION-MAKING. ➢ ASSESSMENT OF EFFECTIVENESS AND EXPECTED OUTCOMES.	Week 3	Integrate the problem-solving process into the application of therapeutic **heat** for a patient by practicing the techniques with a classmate, discussing outcomes and soliciting feedback.
4- ***THERAPEUTIC ULTRASOUND:*** ➢ PHYSICAL PRINCIPLES OF ULTRASOUND. ➢ PRODUCTION OF ULTRASOUND WAVES. ➢ CHARACTERISTICS OF THE ULTRASOUND WAVE AND TREATMENT PARAMETERS. ➢ THERMAL & NONTHERMAL EFFECTS OF ULTRASOUND. ➢ TREATMENT EFFECTIVENESS OF THERAPEUTIC ULTRASOUND.	Week 4	Describe and apply therapeutic **ultrasound** to accomplish a specific treatment goal, including the explanation of the treatment to the patient in terms that the patient will understand.
5- ***HYDROTHERAPY:*** ➢ PHYSICAL PROPERTIES OF WATER. ➢ PHYSIOLOGICAL EFFECTS OF WATER. ➢ MECHANICAL EFFECTS OF WATER. ➢ AQUATIC (POOL) THERAPY. ➢ ASSESSMENT OF EFFECTIVENESS AND EXPECTED OUTCOMES FOR HYDROTHERAPY.	Week 5	Describe physical principles of **water** and how it can be therapeutically beneficial for a patient.
6- ***ELECTROMAGNETIC LASER, WAVES— DIATHERMY, AND PULSED ELECTROMAGNETIC***	Week 6	Describe the common concepts for the theory of pain transmission and

FIELDS: ➢ ELECTROMAGNETIC WAVES. ➢ **LIGHT THERAPY**. ➢ Physical Properties of Lasers. ➢ Instrumentation and Clinical Application of Lasers. ➢ Clinical Application of Laser. ➢ **DIATHERMY.** ➢ Therapeutic Diathermy Devices: Delivery of Electromagnetic Waves to the Patient. ➢ Clinical Decision-Making: When Is Diathermy the Treatment of Choice		perceptionand explain it in terms that a patient would understand.
7- SPINAL TRACTION: ➢ FOUNDATIONS OF TRACTION. ➢ BASIC APPLICATIONS ➢ OF CLINICAL TRACTION. ➢ HOME TRACTION. ➢ PATIENT OUTCOME EVIDENCE.	Week 7	Discuss the importance of appropriate patient positioning techniques for the application of traction by describing the line of pull and the impact of gravity.
8- INTERMITTENT PNEUMATIC COMPRESSION: ➢ HISTORY AND THEORY OF APPLICATION. ➢ INDICATIONS FOR INTERMITTENT PNEUMATIC COMPRESSION. ➢ CLINICAL APPLICATION OF IPC.	Week 8	Demonstrate patient positioning for, clinical application of, and removal of an intermittent compression device for edema reduction in the upper and lower extremity
9- FOUNDATIONS OF CLINICAL ELECTROTHERAPY: ➢ OVERVIEW OF ELECTROTHERAPY. ➢ PRINCIPLES OF ELECTRICITY: MAKING THE PHYSICS MAKE SENSE. ➢	Week 9	Demonstrate the adjustment of various parameters on electrical stimulation devices to intentionally elicit sensory, motor, and fast pain responses and accurately document the parameters.
10- CLINICAL ELECTRICAL STIMULATION: ➢ THERAPEUTIC CURRENTS BY NAME: VARIATIONS OF THE BASIC CURRENTS. ➢ THE BOTTOM LINE FOR ELECTROTHERAPY.	Week 10	Describe several different types of electrodes that can be used for the delivery of electrical stimulation to a patient and demonstrate the application of each for therapeutic purposes.
11- IONTOPHORESIS: ➢ INSTRUMENTATION FOR ELECTROTHERAPY. ➢ ELECTROTHERAPY APPLICATION AND TECHNIQUES: WHY USE ELECTROTHERAPY. ➢ Application of Iontophoresis. ➢ Dosage and the Iontophoretic Equation.	Week 11	Prepare the skin for the application of iontophoresis and predict common skin reactions that follow the application of iontophoresis & Calculate dosage with iontophoresis using common technique.
12- ***CLINICAL APPLICATIONS FOR WHIRLPOOLS***: ➢ Types of Whirlpools.	Week 12	Identify practical application techniques and challenges for thermal

➢ Preparatory Considerations. ➢ Upper and Lower Extremity Techniques. ➢ Full-Body Immersion Technique.		agents by participating in problem-solving activities in guided lab activities using physical agents.
Practical Topics	**Week**	**Learning Outcome**
NON.		

Questions Example Design:

Q.1/ Case study discussion. (20 M)

A: A 56-year-old female is referred with a diagnosis of headaches and right neck pain. Upon examination, several active myofascial trigger points are found in the right upper trapezius that reproduce the patient's lateral neck pain and headaches upon compression. She also reports tightness and discomfort with cervical flexion and left lateral flexion.

Answer the following questions briefly (CLINICAL DECISION)

1. Does the patient have a dysfunction, limitation, or problem that can be improved with the use of cryotherapy?
2. Is the patient appropriate for cryotherapy (i.e., do any of the general precautions or contraindications to cryotherapy apply to the patient or are there any specific considerations regarding application of cryotherapy to this patient)?
3. What are the specific goals to be achieved with the use of cryotherapy?
4. What specific form of cryotherapy would be appropriate for the patient?
5. What specific parameters of vapocoolant spray would be appropriate for the patient?
6. What are the proper application procedures for vapocoolant spray (and stretch)?

B:

Your patient is a 38-year-old construction worker who had his right hand crushed under a heavy weight at work 3 months ago. He suffered fractures to his second, third, and fourth proximal phalanges and his second and third metacarpals, and he dislocated the metacarpal-phalangeal joint of his thumb. His hand was immobilized in a splint for 6 weeks. He is unable to return to work because of the significant loss of function of his right hand.

Answer the following questions briefly (CLINICAL DECISION)

1. Does the patient have a dysfunction, limitation, or problem that can be improved with the use of therapeutic heat?
2. Is the patient appropriate for therapeutic heat? Do any of the general precautions or contraindications to therapeutic heat apply to the patient or are there any specific application of therapeutic heat to this patient?
3. What are the specific goals to be achieved with the use of therapeutic heat?
4. What specific aspects of therapeutic heat would be appropriate for this patient?
5. What are the proper application procedures for therapeutic heat?

Q.2/ Choose the most appropriate answer (20 Marks)

1. Heat abstraction occurs when there is direct contact between the skin and moving fluid particles.
   a. Conduction
   b. Convection
   c. Evaporation
   d. Convection & Conduction
2. The basis for cryotherapy that occur when tissue temperature is lowered.
   a. ↓ blood flow and tissue metabolism
   b. ↑ bleeding and acute inflammation immediately or soon after injury
   c. allowing for lessees of motion.
   d. Elevate a patient's pain threshold, with less discomfort.
3. Is used as a first-aid measure after trauma and as an complementary tool in the rehabilitation of musculoskeletal and neuromuscular dysfunctions.
   a. Cryotherapy
   b. Heat therapy
   c. Ultrasound Therapy
   d. Diathermy therapy
4. When sensory information reaches the brain, the information is integrated with the temperature of the blood circulating through the hypothalamus. Which of the mechanisms regulates temperature?

   a.Vasodilation or vasoconstriction of blood vessels
   b. Shivering, to maintain heat
   c. Sweating, to lose heat
   d. All of the above are examples of temperature regulation.

5. Elevating the tissue temperature results in an increase in blood flow to the area, attributable in part to the vasodilatory response in surface blood vessels. What mechanism normally prevents excessive heat accumulation?

a. ↓blood flow removes heat from the area, and blood cooler.
b. ↑blood flow removes heat from the area, and blood cooler.
c. ↑blood flow moves heat into the area, and blood warmer.
d. ↑blood flow removes heat from the area, and blood warmer.

6. Cold is commonly used in the management of acute inflammation and edema. Which of the following interventions has been the most successful in controlling pain and edema in the management of acute ankle sprains?

a. Cold

b. Compression

c. No difference has been identified between the use of cold or compression separately or together

d. Cold and compression.

7. Muscle guarding is a protective mechanism to protect against potential pain and further injury or pain associated with joint movement. Heat application to relieve muscle guarding accomplishes all but which of the following?

a. Increase in pain perception

b. Muscle relaxation

c. Increase in ROM

d. Reduction of pain.

8. During a 30-minute ice pack application skin temperature decreases (20°C to 25°C).The depth of cooling is related to the treatment duration and the size of the area being treated.
   a. Treatment duration increases
   b. the greater the temperature increases and depth of cooling.
   c. the smaller the area being cooled.
   d. Treatment duration decrease.
9. Which of the following modalities has the greatest likelihood of frostbite?
   a. Ice immersion
   b. Reusable cold packs
   c. Ice massage
   d. Ice bag
10. Which of the following is a contraindication to the use of a paraffin bath?
   a. No range of motion
   b. Chronic conditions
   c. Pain
   d. Skin conditions
11. Which of the following devices uses convection as the method of heat transfer?
   a. Ice bag
   b. Whirlpool
   c. Moist heat packs
   d. Therapeutic ultrasound

12. Which of the following is not a local effect of cold application?

a. Decreased rate of cell metabolism

b. Decreased muscle spindle activity

c. Decreased nerve conduction velocity

d. Decreased viscosity of fluids in the area

13. Which of the following modalities has the greatest depth of penetration into the tissues?
    a. Moist heat pack
    b. Hot whirlpool
    c. Infrared lamp
    d. Ice bag
14. Which of the following is not a local effect of heat application?
    a. Increased rate of cell metabolism
    b. Increased blood flow
    c. Increased muscle tone
    d. Decreased muscle spasm
15. A ____ degree F drop in skin temperature is needed to reduce the sensitivity of muscle spindles.
    a. 5
    b. 9
    c. 13
    d. 17

16. The primary reason for the use of cold during the immediate treatment of an injury is:
    a. To decrease swelling
    b. To limit hemorrhage
    c. To reduce pain
    d. To decrease cell metabolism

17. The least amount of reflection of ultrasonic energy occurs between:
    a. Water and soft tissue

b. Soft tissue and fat

c. Soft tissue and bone

d. Soft tissue and air

18. All of the following are nonthermal (mechanical) effects of ultrasound except:

a. Increased blood flow

b. Increased extensibility of collagen-rich structures

c. Synthesis of protein

d. Increased cell membrane permeability

19. When using a shortwave diathermy induction drum, thedrum should be positioned ___ from the patient's skin.

a. 1 in.

b. 2 in.

c. 4 in.

d. 8 in.

20. The energy from a shortwave diathermy unit may scatter as much as ____ from the source.

a. 1 ft

b. 3 ft

c. 6 ft

d. 9 ft

Q.3/ Answer the following briefly: (20 Marks)

A/ Enumerates Factors Influencing Response to Cold Therapy.

B/ Explain methods of providing cryotherapy.

Q.4/ Complete the following table comparing and contrasting therapeutic ultrasound and shortwave diathermy: (20 Marks)

	ULTRASOUND	***SHORTWAVE DIATHERMY***
Type of energy:		
Tissue heated:		
Volume of tissue heated:		
Temperature increase:		
Heat retention:		

Q.5/Answer the followings: (20 Marks)

A: Explain the classification of LASER.

B: Enumerate the properties of LASER

C: Discuss the Indications & Contraindications for Lasers.

D: What is LED.

Extra notes:
External Evaluator: