Program	BS Physical Education	Course Code	PE-404	Credit Hours	01
Course Title	**Exercise Physiology (Practical)**				

Course Introduction

The practical component of the Exercise Physiology course is designed to provide students with hands-on experience in understanding the physiological responses and adaptations to exercise. Students will engage in various activities, including fitness testing, exercise performance measurements, and physiological monitoring. These practical sessions reinforce theoretical knowledge and develop valuable skills essential for sports science and physical education.

Learning Outcomes

On the completion of the course, the students will:

- Understand the basic concepts of exercise physiology and its relevance to physical activity and sports.
- Describe the physiological systems involved in exercise and their adaptations to training.
- Explain the energy systems used during different types of exercise.
- Analyze the acute and chronic physiological responses to exercise.
- Evaluate the effects of various environmental conditions on exercise performance.
- Apply physiological principles to design effective exercise programs.
- Conduct basic exercise physiology assessments and interpret the results.

	Course Content	Assignments/Readings
Week 1	**Introduction to Practical Sessions** • Orientation to the exercise physiology lab • Safety procedures and ethical considerations in exercise testing • Overview of practical session objectives and expectations	From Books and Class Lectures
Week 2	**Cardiovascular Responses to Exercise** • Measurement of heart rate, blood pressure, and cardiac output at rest and during exercise • Understanding the concept of VO_2 max and conducting a VO_2 max test • Analysis of cardiovascular data using software	From Books and Class Lectures
Week 3	**Respiratory Responses to Exercise** • Measurement of respiratory rate, tidal volume, and minute ventilation • Conducting a spirometry test to measure lung volumes and capacities • Understanding the concept of ventilatory threshold	From Books and Class Lectures
Week 4	**Muscular Responses to Exercise** • Measurement of muscle strength using dynamometry • Electromyography (EMG) to study muscle activity during different types of exercise	From Books and Class Lectures

	• Understanding muscle fatigue and conducting fatigue tests	
Week 5	**Metabolic Responses to Exercise** • Measurement of resting metabolic rate (RMR) and basal metabolic rate (BMR) • Conducting indirect calorimetry to assess energy expenditure during exercise • Analysis of substrate utilization (carbohydrates vs. fats) during exercise	From Books and Class Lectures
Week 6	**Hormonal Responses to Exercise** • Understanding the role of hormones in exercise physiology • Measurement of blood glucose and lactate levels before and after exercise • Analysis of hormonal responses using saliva or blood samples	From Books and Class Lectures
Week 7	**Thermoregulatory Responses to Exercise** • Measurement of body temperature and skin temperature during exercise • Understanding the mechanisms of heat production and heat loss • Conducting sweat rate tests and hydration status assessments	From Books and Class Lectures
Week 8	**Neuromuscular Adaptations to Exercise** • Understanding the neuromuscular system's role in exercise • Conducting reaction time and coordination tests • Analysis of neuromuscular adaptations using performance data	From Books and Class Lectures
Week 9	**Exercise Testing and Prescription** • Conducting various fitness tests (e.g., 1RM, vertical jump, agility tests) • Understanding the principles of exercise prescription for different populations • Designing exercise programs based on fitness test results	From Books and Class Lectures
Week 10	**Exercise and Health** • Understanding the impact of exercise on chronic diseases (e.g., cardiovascular disease, diabetes) • Conducting health assessments (e.g., BMI, body composition analysis) • Analysis of exercise intervention programs for disease prevention	From Books and Class Lectures
Week 11	**Endurance Training** • Understanding the principles of endurance training • Conducting aerobic endurance tests (e.g., Cooper test, beep test)	From Books and Class Lectures

	• Analysis of endurance training programs and performance outcomes	
Week 12	**Strength and Power Training** • Understanding the principles of strength and power training • Conducting strength and power tests (e.g., 1RM, power clean) • Analysis of strength and power training programs and performance outcomes	From Books and Class Lectures
Week 13	**Flexibility and Mobility** • Understanding the principles of flexibility and mobility training • Conducting flexibility tests (e.g., sit and reach, goniometry) • Designing flexibility and mobility programs	From Books and Class Lectures
Week 14	**Recovery and Regeneration** • Understanding the importance of recovery in exercise training • Conducting tests to assess recovery status (e.g., heart rate variability, muscle soreness) • Analysis of recovery techniques (e.g., stretching, massage, cryotherapy)	From Books and Class Lectures
Week 15	**Environmental Factors and Exercise** • Understanding the impact of environmental factors (e.g., altitude, temperature) on exercise performance • Conducting exercise tests in different environmental conditions • Analysis of performance data and adaptations to environmental stressors	From Books and Class Lectures
Week 16	**Practical Exam and Review** • Practical exam assessing skills learned throughout the course • Review session and discussion of key learnings • Course wrap-up and feedback	From Books and Class Lectures

Textbooks and Reading Material

Textbooks

- American College of Sports Medicine. (2018). ACSM's guidelines for exercise testing and prescription (10th ed.). Wolters Kluwer.
- Ehrman, J. K. (2018). Advanced exercise physiology (2nd ed.). Human Kinetics.
- Kenney, W. L., Wilmore, J. H., & Costill, D. L. (2021). Physiology of sport and exercise (8th ed.). Human Kinetics.
- McArdle, W. D., Katch, F. I., & Katch, V. L. (2015). Essentials of exercise physiology (5th ed.). Lippincott Williams & Wilkins.
- McArdle, W. D., Katch, F. I., & Katch, V. L. (2015). Exercise physiology: Nutrition, energy, and human performance (8th ed.). Lippincott Williams & Wilkins.
- Powers, S. K., & Howley, E. T. (2018). Exercise physiology: Theory and application to fitness and performance (10th ed.). McGraw-Hill Education.