

Program	BS Physical Education	Course Code	PE-403	Credit Hours	02
Course Title	Exercise Physiology (Theory)				
Course Introduction					
<p>This course provides an in-depth understanding of the physiological responses and adaptations to exercise. It covers the principles of human physiology as they relate to physical activity, including energy metabolism, cardiovascular and respiratory functions, muscular and neural adaptations, and the impact of exercise on health and performance.</p>					
Learning Outcomes					
<p>On the completion of the course, the students will:</p> <ul style="list-style-type: none"> • 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 Exercise Physiology <ul style="list-style-type: none"> • Definition and scope • Historical development • Importance in sports science and physical education 				From Books and Class Lectures
Week 2	Energy Metabolism <ul style="list-style-type: none"> • ATP production and energy systems • Anaerobic and aerobic metabolism • Energy continuum and interplay during exercise 				From Books and Class Lectures
Week 3	Cardiovascular Responses to Exercise <ul style="list-style-type: none"> • Structure and function of the cardiovascular system • Acute responses to exercise • Chronic adaptations to endurance and resistance training 				From Books and Class Lectures
Week 4	Respiratory Responses to Exercise <ul style="list-style-type: none"> • Structure and function of the respiratory system • Pulmonary ventilation and gas exchange 				From Books and Class Lectures

	<ul style="list-style-type: none"> • Respiratory adaptations to exercise 	
Week 5	<p>Muscular Responses to Exercise</p> <ul style="list-style-type: none"> • Muscle fiber types and their characteristics • Neuromuscular adaptations to training • Muscle fatigue and recovery 	From Books and Class Lectures
Week 6	<p>Nutrition for Athletes</p> <ul style="list-style-type: none"> • Macronutrient and micronutrient needs • Timing of nutrient intake • Supplements and ergogenic aids 	From Books and Class Lectures
Week 7	<p>Practical Session: Exercise Testing and Measurement</p> <ul style="list-style-type: none"> • Conducting VO₂ max tests • Measuring lactate threshold • Assessing muscular strength and endurance 	From Books and Class Lectures
Week 8	<p>Thermoregulation and Fluid Balance</p> <ul style="list-style-type: none"> • Body temperature regulation during exercise • Effects of dehydration and hyperhydration • Strategies for maintaining fluid balance 	From Books and Class Lectures
Week 9	<p>Endocrine Responses to Exercise</p> <ul style="list-style-type: none"> • Hormonal regulation of metabolism • Acute and chronic endocrine responses to exercise • Impact of exercise on insulin sensitivity and glucose metabolism 	From Books and Class Lectures
Week 10	<p>Environmental Influences on Exercise</p> <ul style="list-style-type: none"> • Exercise in hot and cold environments • Altitude training and its effects • Pollution and exercise performance 	From Books and Class Lectures
Week 11	<p>Exercise and Health</p> <ul style="list-style-type: none"> • Exercise prescription for health and fitness • Role of exercise in the prevention and treatment of chronic diseases • Mental health benefits of regular physical activity 	From Books and Class Lectures
Week 12	<p>Practical Session: Exercise Prescription and Program Design</p> <ul style="list-style-type: none"> • Designing exercise programs for different populations • Monitoring and adjusting training loads • Case studies and role-playing 	From Books and Class Lectures

Week 13	Nutrition and Exercise <ul style="list-style-type: none"> • Macronutrient and micronutrient needs for athletes • Timing and composition of meals for optimal performance • Supplements and ergogenic aids 	From Books and Class Lectures
Week 14	Special Populations and Exercise <ul style="list-style-type: none"> • Exercise considerations for children and adolescents • Training adaptations for older adults • Exercise recommendations for individuals with chronic conditions 	From Books and Class Lectures
Week 15	Research in Exercise Physiology <ul style="list-style-type: none"> • Current research trends and findings • Methodologies in Exercise Physiology Research • Critical analysis of research studies 	From Books and Class Lectures
Week 16	Review and Final Exam Preparation <ul style="list-style-type: none"> • Review of key concepts and principles • Mock exams and practice questions • Final exam preparation 	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.

Suggested Readings

- **Journals:** Medicine & Science in Sports & Exercise, Journal of Applied Physiology, European Journal of Applied Physiology
- **Websites:** American College of Sports Medicine (ACSM), National Strength and Conditioning Association (NSCA)
- **Videos:** Online tutorials on exercise testing and assessment, webinars on current trends in exercise physiology

