Subject Description Form

Subject Code	BME32164
Subject Title	**Applied Exercise Physiology for Performance and Health**
Credit Value	3
Level	3
Prerequisite	ABCT2334 Human Pathophysiology; and BME21163 Functional Human Anatomy for Rehabilitation Engineering and Sports Science
Objectives	This course aims to develop students' knowledge on the basic concepts of energy metabolism and the physiological responses to exercise and training. In addition, exercise training principles on various types of training and common physiological assessment methods on fitness will also be examined.
Intended Learning Outcomes	Upon completion of the subject, students will be able to: a. Discuss how the different body systems respond and adapt to various types of exercises b. Describe how these body systems relate to athletic performances and the health of an individual c. Identify and use different assessment methods to measure the status of various physiological systems d. Critically evaluate and prescribe evidence-based exercise interventions for the enhancement of performance and prevention of injuries or diseases
Contribution to Programme Outcomes (Refer to Part I Section 10)	▪ Programme Outcome 1: Demonstrate an ability to apply knowledge of mathematics, science, and engineering appropriate to the Biomedical Engineering (BME) discipline. (Teach, Practice and Measure) ▪ Programme Outcome 2: Demonstrate an ability to design and conduct BME experiments, as well as to analyze and interpret data. (Teach and Practice) ▪ Programme Outcome 4: Demonstrate an ability to identify, formulate, and solve BME problems. (Teach, Practice and Measure) ▪ Programme Outcome 5: Demonstrate an ability to understand the impact of BME solutions in a global and societal context, especially the importance of health, safety and environmental considerations to both workers and the general public. (Teach) ▪ Programme Outcome 11: Demonstrate an ability to communicate effectively and advise clients, professional colleagues, and other members of the community. (Teach and Practice)

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<td>Subject Synopsis / Indicative Syllabus</td>
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Module 1: Foundations of exercise physiology
▪ Essential Bioenergetics and anaerobic/aerobic metabolic pathways
▪ Metabolic response and adaptation to exercise/training
Module 2: Exercise physiology and body systems
▪ Acute/chronic effects of exercise on the musculoskeletal, nervous, cardiovascular, and endocrine systems
Module 3: Physiological assessment of human fitness
▪ Common physiological assessments (i.e. strength, joint range-of-motion, anaerobic power and fitness, maximal aerobic capacity and endurance, mechanical power, speed, agility, anthropometry, and body composition)
▪ Factors affecting performance
Module 4: Training for health and performance
▪ Principles of training and body composition
▪ Common training methods and their physiological effects (i.e. warm-up, flexibility, balance, resistance, power, anaerobic conditioning, speed and agility, endurance, and concurrent training)
▪ Nutrition, environmental factors, and health conditions in exercise physiology
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<td>Teaching and Learning Methodology</td>
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Lectures and laboratories
<table>
<tr><td rowspan="2">Teaching / learning methodology</td><td colspan="4">Intended subject learning outcomes to be assessed (Please tick as appropriate)</td></tr>
<tr><td>a</td><td>b</td><td>c</td><td>d</td></tr>
<tr><td>1. Lectures</td><td>√</td><td>√</td><td>√</td><td>√</td></tr>
<tr><td>2. Laboratories</td><td>√</td><td></td><td>√</td><td>√</td></tr>
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Assessment Methods in Alignment with Intended Learning Outcomes

Specific assessment methods/tasks	% weighting	Intended subject learning outcomes to be assessed (Please tick as appropriate)			
		a	b	c	d
1. Lab reports	30%	√		√	√
2. Group projects	20%	√	√	√	√
3. Final exam	50%	√	√	√	√
Total	100%				

Explanation of the appropriateness of the assessment methods in assessing the intended learning outcomes:

Lab report: These are designed to provide opportunities for students to gain hands-on experiences in conducting physiological assessments.

Group project: Students will collaborate to conduct research on an exercise regime for performance enhancement, injury prevention, or health management.

Final exam: The final exam will assess the student's knowledge on the course material throughout the entire semester.

Student Study Effort Required

Class contact:	
▪ Lecture	33 Hrs.
▪ Laboratories	6 Hrs.
Other student study effort:	
▪ Self-study	48 Hrs.
▪ Preparation for lab sessions	6 Hrs.
▪ Collaborative learning and group work	24 Hrs.
Total student study effort	117 Hrs.

Reading List and References

Recommended Text

- Hoffman. (2014). Physiological Aspects of Sport Training and Performance (2nd Ed.). Champaign, IL: Human Kinetics.
- Housh, Housh, & DeVries. (2016). Applied Exercise and Sport Physiology, With Labs. (4th Ed.). Scottsdale, AZ: Holcomb Hathaway.
- Kraemer, Fleck, & Deschenes. (2020). Exercise Physiology: Integrating Theory and Application. (3rd Ed.). Philadelphia, PA: Wolters Kluwer.

	▪ Maud, & Foster. (2005). Physiological Assessment of Human Fitness. (2nd Ed.). Champaign, IL: Human Kinetics. ▪ Powers, Howley, & Quindry. (2024). Exercise Physiology: Theory and Application to Fitness and Performance. (12th Ed.). New York, NY: McGraw-Hill Education. ▪ Smith, Plowman, & Ormsbee. (2022). Exercise Physiology for Health, Fitness, and Performance. (6th Ed.). Philadelphia, PA: Wolters Kluwer.
Date of Last Major Revision	29 August 2024
Date of Last Minor Revision	29 August 2025