Subject Description Form

Subject Code	BME5125
Subject Title	Clinical and Sports Biomechanics
Credit Value	3
Level	5
Responsible staff & Department/School	Dr Kenneth CHENG (BME)
Pre-requisite / Co-requisite/ Exclusion	Nil
Objectives	To apply the biomechanics to understand the normal functions of musculoskeletal system during normal activities and sports and pathomechanics of common musculoskeletal disorders, and to develop ways and means to recover lost functions of musculoskeletal system.
Intended Learning Outcomes	Upon completion of the subject, students will be able to: a. Demonstrate the understanding to the nature, structure & regulating mechanism of musculoskeletal system. b. Apply biomechanical concepts to appreciate and analyze the pathomechanics of common musculoskeletal disorders. c. Develop ways and means to recover lost functions of musculoskeletal system for the improvement of life quality.
Contribution to Programme Outcomes (Refer to Part I Section 2)	Programme Learning Outcome (a): Acquire and apply advanced levels of knowledge and skills in BME professions. (Teach, Practice, and Measure) Programme Learning Outcome (c): Demonstrate a higher level of professional competence to cope with the rapid changes in practice. (Teach)
Subject Synopsis/ Indicative Syllabus	Basic biomechanics of rigid and deformable bodies will be introduced to understand the functions and load transfer of human musculoskeletal system under various activities and sports. Various clinically relevant musculoskeletal disorders, such as low back disorder, neck pain, foot disorder, pressure ulcer, and bone and joint injuries, will be used as examples to illustrate the application of biomechanical principles for understanding the normal functions of the musculoskeletal system, investigating possible causes of the disorders, evaluating the level of severity as well as devising possible treatments for the disorders. Biomechanics of the disorders will be appreciated at the tissue, organ and system levels.

Teaching/Learning Methodology

There will be lectures and tutorials dealing with fundamental mechanics and application examples on human musculoskeletal system. Students will be required to read widely in specific areas. A review report is required in a specific area.

Teaching/learning methodology	Intended subject learning outcomes			
	a	b	c	
1. Lectures	√	√	√	
2. Tutorials	√	√	√	

Assessment Methods in Alignment with Intended Learning Outcomes

Specific assessment methods/tasks	% weighting	Intended subject learning outcomes to be assessed					
		a	b	c			
Continuous assessment (including assignments and writing report)	60%	√	√	√			
Final examination	40%	√	√				
Total	100 %						

Note: Assignments will assess outcomes a and b; while writing reports will assess outcome c.

Student Study Effort Expected

Class contact:	
▪ Lecture	36 Hrs.
▪ Tutorial	3 Hrs.
Other student study effort:	
▪ Self-study	39 Hrs.
▪ Assignment and paper preparation	39 Hrs.
Total student study effort	117 Hrs.

Reading List and References	▪ Hall, S. J. (2021). *Basic biomechanics* (9th ed.). McGraw-Hill Education. ▪ Knudson, D. V. (2021). *Fundamentals of biomechanics* (3rd ed.). Springer. ▪ McGinnis, P. M. (2020). *Biomechanics of sport and exercise* (4th ed.). Human Kinetics. ▪ Blazevich, A. (2017). *Sports biomechanics : the basics : optimising human performance* (3rd ed.). Bloomsbury. ▪ Özkaya, N., Leger, D., Goldsheyder, D. & Nordin, M. (2017). (4th ed.). Springer. ▪ Nordin, M., & Frankel, V. H. (2022). *Basic biomechanics of the musculoskeletal system* (5th ed.). Wolters Kluwer. ▪ Nigg, B. M., & Herzog, W. (2007). *Biomechanics of the musculo-skeletal system* (3rd ed.). John Wiley & Sons. ▪ Bartlett, R., & Bussey, M. (2012). *Sports biomechanics ; reducing injury risk and improving sports performance* (2nd ed.). Routledge. ▪ Whiting, W. C., & Zernicke, R. F. (2008). *Biomechanics of musculoskeletal injury* (2nd ed.). Human Kinetics. ▪ Richards, J. (2018). *The comprehensive textbook of clinical biomechanics* (2nd ed.). Elsevier. ▪ Brinckmann, P., Frobin, W., Leivseth, G., & Drerup, B. (2016). *Orthopedic biomechanics* (2nd ed.). Thieme. ▪ Koh, J., Zaffagnini, S., Kuroda, R., Longo, U. G., & Amirouche, F. (2021). *Orthopaedic biomechanics in sports medicine*. Springe. ▪ Chaffin, D. B., Andersson, G., & Martin, B. J. (2006). *Occupational biomechanics* (4th ed.). Wiley-Interscience. ▪ Mayer, T. G., Gatchel, R. J., & Polatin, P. B. (2000). *Occupational musculoskeletal disorders : function, outcomes, and evidence*. Lippincott Williams & Wilkins. ▪ Zhang, M., & Fan, Y. (2015). *Computational biomechanics of the musculoskeletal system*. CRC Press.
Date of Last Major Revision	20 July 2023
Date of Last Minor Revision	20 July 2023