

Subject Description Form

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| 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 | <p>Upon completion of the subject, students will be able to:</p> <ol style="list-style-type: none"> Demonstrate the understanding to the nature, structure & regulating mechanism of musculoskeletal system. Apply biomechanical concepts to appreciate and analyze the pathomechanics of common musculoskeletal disorders. 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) | <p>Programme Learning Outcome (a): Acquire and apply advanced levels of knowledge and skills in BME professions. (Teach, Practice, and Measure)</p> <p>Programme Learning Outcome (c): Demonstrate a higher level of professional competence to cope with the rapid changes in practice. (Teach)</p> |
| Subject Synopsis/ Indicative Syllabus | <p>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.</p> |

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| 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. |

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| Reading List and References | <ul style="list-style-type: none"> ▪ Hall, S. J. (2021). <i>Basic biomechanics</i> (9th ed.). McGraw-Hill Education. ▪ Knudson, D. V. (2021). <i>Fundamentals of biomechanics</i> (3rd ed.). Springer. ▪ McGinnis, P. M. (2020). <i>Biomechanics of sport and exercise</i> (4th ed.). Human Kinetics. ▪ Blazeovich, A. (2017). <i>Sports biomechanics : the basics : optimising human performance</i> (3rd ed.). Bloomsbury. ▪ Özkaya, N., Leger, D., Goldsheyder, D. & Nordin, M. (2017). (4th ed.). Springer. ▪ Nordin, M., & Frankel, V. H. (2022). <i>Basic biomechanics of the musculoskeletal system</i> (5th ed.). Wolters Kluwer. ▪ Nigg, B. M., & Herzog, W. (2007). <i>Biomechanics of the musculo-skeletal system</i> (3rd ed.). John Wiley & Sons. ▪ Bartlett, R., & Bussey, M. (2012). <i>Sports biomechanics ; reducing injury risk and improving sports performance</i> (2nd ed.). Routledge. ▪ Whiting, W. C., & Zernicke, R. F. (2008). <i>Biomechanics of musculoskeletal injury</i> (2nd ed.). Human Kinetics. ▪ Richards, J. (2018). <i>The comprehensive textbook of clinical biomechanics</i> (2nd ed.). Elsevier. ▪ Brinckmann, P., Frobin, W., Leivseth, G., & Drerup, B. (2016). <i>Orthopedic biomechanics</i> (2nd ed.). Thieme. ▪ Koh, J., Zaffagnini, S., Kuroda, R., Longo, U. G., & Amirouche, F. (2021). <i>Orthopaedic biomechanics in sports medicine</i>. Springer. ▪ Chaffin, D. B., Andersson, G., & Martin, B. J. (2006). <i>Occupational biomechanics</i> (4th ed.). Wiley-Interscience. ▪ Mayer, T. G., Gatchel, R. J., & Polatin, P. B. (2000). <i>Occupational musculoskeletal disorders : function, outcomes, and evidence</i>. Lippincott Williams & Wilkins. ▪ Zhang, M., & Fan, Y. (2015). <i>Computational biomechanics of the musculoskeletal system</i>. CRC Press. |
| Date of Last Major Revision | 20 July 2023 |
| Date of Last Minor Revision | 20 July 2023 |