Subject Description Form

Subject Code	BME21119
Subject Title	**Fundamentals of Biomechanics**
Credit Value	3
Level	2
Prerequisite	Nil
Objectives	Biomechanics is one of the most important supporting subjects for the principles and practices of health technology. This subject aims to understand the principles of rigid and deformable body mechanics extensively in the biomechanical context.
Intended Learning Outcomes	Upon completion of the subject, students will be able to: a. Demonstrate understanding of the fundamentals of rigid body mechanics, i.e., statics, kinematics, and kinetics; b. Demonstrate understanding of basic deformable body mechanics, i.e., stress/strain analysis and basic mechanical properties of materials including elasticity and viscoelasticity; c. Apply basic mechanics to load and motion analysis for human body supports and musculoskeletal system.
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) ▪ Programme Outcome 4: Demonstrate an ability to identify, formulate, and solve BME problems. (Teach)
Subject Synopsis/ Indicative Syllabus	Statics applied to musculoskeletal system; dynamics, kinematics, and kinetics of particle and rigid body; work and energy; anthropometry; inverse dynamics; human joint load analysis; mechanical properties of materials; mechanics of deformable body; stress/strain analysis for axial, torsional, flexural, and combined loads; stress transformation and principal stress; strength design theory; and mechanical properties of biological tissues.
Teaching and Learning Methodology	There will be lectures and tutorials dealing with fundamental mechanics and application examples on human body. Additional teaching materials will be provided for students to self-learn.

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					
Attendance, home assignments, and class quiz	40%	√	√	√					
Final exam	60%	√	√	√					
Total	100%								

Note: To pass this subject, students must obtain grade D or above in both continuous assessment (including home assignments and class quiz) and final examination.

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

All the continuous assessments and final examination will be designed to assess the 3 outcomes.

Student Study Effort Expected

Class contact:	
▪ Lecture	33 Hrs.
▪ Tutorial	6 Hrs.
Other student study effort:	
▪ Self-study	48 Hrs.
▪ Assignments	39 Hrs.
Total student study effort	126 Hrs.

Reading List and References

- Andrew Pytel, Jaan Kiusalaas. *Engineering mechanics : statics*, Boston, MA : Cengage Learning, 2017
- Andrew Pytel, Jaan Kiusalaas. *Engineering mechanics : dynamics*, Boston, MA : Cengage Learning, 2017
- Ferdinand Pierre Beer, E. Russell Johnston, John T. DeWolf, David F. Mazurek. *Mechanics of Materials*, New York, NY : McGraw-Hill, 2015
- Riley W.F., Sturges L.D. and Morris D.H., *Mechanics of Materials*, John Wiley & Sons Inc., 2006.
- Riley W.F., Sturges L.D. and Morris D.H., *Statics and Mechanics of Materials*, John Wiley & Sons Inc., 1996.
- Ozkaya N. and Nordin M., *Fundamentals of Biomechanics: Equilibrium,*

	Motion, and Deformation, Van Nostrand Reinhold, New York, 1999.
Date of Last Major Revision	14 July 2014
Date of Last Minor Revision	