

SUBJECT DESCRIPTION FORM

SUBJECT CODE: HTI2122

SUBJECT TITLE: Mechanics of Tissues and Biomaterials

CREDITS: 3

PRE-REQUISITES: Nil

RESPONSIBLE DEPARTMENT: Department of Health Technology & Informatics

RESPONSIBLE MEMBER OF THE ACADEMIC STAFF:

Dr. Ming Zhang

CONTACT HOURS:

Total contact hours 44 hours

RATIONALE:

Biomechanics of tissues and biomaterials are important underpinning subjects for principles and practices in health technology.

LEARNING OUTCOMES:

At the end of the subject, students are expected to be able to:

1. Understand basic deformable body mechanics, i.e. stress/strain analysis and basic mechanical properties of materials including elasticity and viscoelasticity;
2. Apply deformable body mechanics to biological system; and
3. Describe the structure-property-function relationship of biological tissues.

SYLLABUS:

Structure of Solids, mechanical properties of materials, mechanics of deformable body, stress/strain analysis for axial, torsional, flexural and combined loads, stress transformation, strength design theory, biocompatibility of biomaterials, mechanical properties of biological tissues (bone, muscle, tendon, ligament and other connective tissues), viscoelasticity, bone fracture and fixation, responses of biological tissues to their mechanical environment

TEACHING-LEARNING METHODS:

There will be lectures and tutorials dealing with fundamental mechanics and application examples on human body. Laboratory will help students to understand the material properties. Students' knowledge is tested by home assignment, class quiz, lab report, and final examination.

ASSESSMENT:

- 40% Continuous Assessment (including Home assignments, Class Quiz, Lab report)
- 60% Final Examination

Note: To pass this subject, students must obtain grade D or above in both continuous assessment and final examination.

REFERENCE MATERIALS:

1. Ozkaya N & Nordin M. Fundamentals of Biomechanics: Equilibrium, Motion and Deformation. Van Nostrand Reinhold. 1999.
2. Nordin M & Frankel VH (ed.). Basic Biomechanics of the Musculoskeletal System. Lea & Febiger. 1989 or 2001
3. Park JB & Lakes RS. Biomaterials: An Introduction. Plenum Press. 1992.
4. Riley WF, Sturges LD and Morris DH, Statics and Mechanics of Materials, John Wiley & Sons Inc., 1996.