

SUBJECT DESCRIPTION FORM

SUBJECT CODE: HTI3122

SUBJECT TITLE: Biomaterials Science and Engineering

CREDITS: 3

PRE-REQUISITES: Nil

RESPONSIBLE DEPARTMENT: Department of Health Technology & Informatics

RESPONSIBLE MEMBER OF THE ACADEMIC STAFF:

Dr. Mo Yang

CONTACT HOURS:

Total Contact	44 hours
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RATIONALE:

This is a general subject on biomaterials. It should provide students with the knowledge of commonly used materials in medicine and some fundamentals in biomaterials science.

LEARNING OUTCOMES:

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

1. Have a broad knowledge of materials science and engineering;
2. Understand the biomaterials surface modification methods and characterizations;
3. Understand biocompatibility and tissue-material interaction; and
4. Appreciate mainstream biomaterials currently used for medical applications,

SYLLABUS:

1. Course introduction, biomaterials defined, structural hierarchy in materials and biology
2. Structure and property of materials
3. Processing, structure and property of biomaterials
4. Biomaterials surface modification methods and characterization.
5. Interaction between human body environment and biomaterials
6. Hard tissue replacement materials
7. Soft tissue replacement implants
8. New trends, standards, ethical issues, and regulations

TEACHING-LEARNING METHODS:

Students are required to attend the class, read a selection of papers, and attend laboratories and demonstrations. They are exposed to various areas in biomaterials science and engineering and taught about requirements, principles and theories involved which are assisted by clinical examples. Students' knowledge is tested by quizzes conducted during the course and final examination.

ASSESSMENT:

60% continuous assessment (Home Assignments, Class Quiz, Lab report)
40% final examination

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

REFERENCE MATERIALS:

Notes and relevant review articles will be handed out.

1. Ratner, B.D., *et al*, (eds.), *Biomaterials Science: An Introduction to Materials in Medicine*, Academic Press, 1996, 2004
2. Park, J.B. and Lakes R.S., *Biomaterials An introduction*, Plenum Press, 1992
3. Black, J., *Biological Performance of Materials: Fundamentals of Biocompatibility*, Dekker, 1992
4. Hastings, G.W. (ed.), *Cardiovascular Biomaterials*, Springer-Verlag, 1992
5. Hench, L.L. and Wilson, J. (eds.), *An Introduction to Bioceramics*, World Scientific, 1993
6. Dumitriu, S. (ed.), *Polymeric Biomaterials*, Marcel Dekker, 1994