

SUBJECT DESCRIPTION FORM

Subject Title: Biomaterials and Tissue Engineering

Subject Code: HTI5124

Credit Value: 3

Date of Submission: Feb 2007

Originating Staff & Department: Dr. Mo YANG (HTI)

Pre-requisites: Nil

Recommended Background Knowledge: knowledge in biomaterials science and engineering

Exclusions: none

Learning Approach:

Students are required to attend the class and research seminars. They are exposed to various facets of biomaterials research and development. They are also provided with the latest development in the recently emerged field of tissue engineering. Students are given assignments and need to make presentations.

Contact Hours:

Lectures/Seminars		30 hours
Quizzes/Group discussions/Presentation		12 hours
	Sub-total:	42 hours
Independent Study Hours:		
Self-study		60 hours
Assignment		25 hours
Preparation for presentation		20 hours
	Sub-total:	105 hours
	Total:	147 hours

Assessment (types & weighting):

Course work (100%)		
Tests		30%
Assignment and presentation		25%
Individual Project Paper		45%

Learning Outcomes:

At the end of the subject, students will be able to:

- appreciate biomaterials that have been successfully developed and used in human bodies
 - understand the most recent developments in biomaterials and tissue engineering
 - be aware of interconnecting issues in biomaterials research and development
 - use, through case studies, the appropriate techniques and right strategies in the successful development of new biomaterials for medical applications
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Syllabus:

1. Bioactive glass and glass ceramics
 2. Bioactive composites
 3. Plasma sprayed bioactive coatings
 4. Blood contacting biomaterials
 5. Surface Characterization in Vacuum XPS/ESCA, AES, SIMS, Contact Angle, AFM
 6. Long term performance of biomaterials
 7. Ethical considerations, good manufacturing practice, standards, and regulatory issues
 8. Tissue engineering: principles
 9. Tissue engineering: applications
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Reference List:

Notes and relevant articles will be handed out.

1. D. Shi (ed.) *Biomaterials and tissue engineering*, Berlin; New York: Springer, 2004
2. Joon B. Park, Joseph D. Bronzino. Boca Ration (ed), *Biomaterials: principles and applications*, CRC press, 2003
3. Ratner, B.D., *et al*, (eds.), *Biomaterials Science: An Introduction to Materials in Medicine*, Academic Press, 2004
4. Pawlowski, L., *The Science and Engineering of Thermal Spray Coatings*, John Wiley & Sons, 1995
5. Hastings, G.W. (ed.), *Cardiovascular Biomaterials*, Springer-Verlag, 1992
6. Wise, D.L., *et al*, (eds.), *Human Biomaterials Applications*, Humana Press, 1996
7. Von Recum, A., (ed.), *Handbook of Biomaterials Evaluation: Scientific, Technical, and Clinical Testing of Implant Materials*, Taylor & Francis, 1999
8. Vickerman, J.C., *Surface Analysis: The Principal Techniques*, John Wiley, 1997