

New Course Code and Title	MS7025 Biological and Bio-Inspired Materials	
Details of Course	Summary of course content (please note that this information provided will also be uploaded to the web for viewing at large) <p>Biological materials and bio-inspired materials. Building blocks of biological materials. Characterization of biological materials. Biominerals: hierarchical and structural performance. Methods of structural protein characterization: chemical structure, primary and secondary structures. Collagen: processing, structure and mechanics. Silks: processing, links between sequence, structure and properties. Bioelastomeric materials. Sclerotized structures, protein/polysaccharide biocomposites. Elastically mismatched materials. Natural adhesives. Biomimetic synthesis: recombinant protein fibers, enzyme- and polypeptide-directed synthesis of functional materials, MEMS technology for surface patterning biomimicry</p>	
	Rationale for introducing this course <p>There is considerable interest in using biomimetic studies to develop new biomaterials and materials for other applications. Research in this area is on the increase at NTU and world-wide. This is an exciting new field and it is important that materials researchers and students are exposed to this topic.</p>	
	Aims and objectives <p>To introduce students to the growing field of bioinspired and biomimetic materials. To offer a truly inter-disciplinary course at the frontier of engineering and life sciences, which will allow them to communicate efficiently in an ever-increasing multidisciplinary research environment.</p>	
Assessment	Quiz / short questions :	30%
	Essay / Paper	70%
	Total:	100 %
To be offered with effect from (state Academic Year and Semester)	Semester 2, AY2010/2011	
Cross Listing (if applicable)	N/A	
Prerequisites (if applicable)	<ul style="list-style-type: none"> Essential Materials Science Materials Structure and Mechanical Behaviour Analysis of Materials Polymer and Composites 	
Preclusions (if applicable)	N/A	
Mode of Teaching & Learning (Lectures, regular tests, Q&A, problem-based learning)	Lectures, Q&A, problem-based learning	

Basic Reading List <ul style="list-style-type: none"> • Compulsory Reading • Supplementary Reading 	<p>N/A</p> <ol style="list-style-type: none"> 1. Vogel, S. (2003). Comparative Biomechanics: Life's Physical World, Princeton University Press. 2. Nelson, D. L. and M. M. Cox (2005). Principles of Biochemistry. New York, W.H. Freeman and Company 3. Meyers, M. A., P. Y. Chen, et al. (2008). "<i>Biological Materials: Structure and Mechanical Properties</i>." Progress in Materials Science 53: 1-206. 4. Specialized papers will be distributed to students weekly before the lectures.
Maximum Class Size	35
Hours of Contact/Academic Units	3 hours/week, 13 week (39 hours) 3 AUs
Workload Per Week (The workload for a 3-AU course must add up to 39 hours of contact hours)	<p>Lecture hours per week : 2.5 Discussion on case studies per week : 0.5</p> <p>Assignments, reading, etc. :</p> <ul style="list-style-type: none"> • Students to read papers distributed every other week for discussions in class. • 1 paper per student to be submitted at the end of the semester. Will count as 70% of the final grade.
	Total hours per week: 3