

Course code	MOOC ON INTRODUCTION TO BIO-INSPIRED DESIGN (30 hours)	L	T	P	J	C
ONL1002		x	x	x	x	1
Pre-requisite	Nil					
Syllabus version	0.2					
Course Objectives:						
To provide a general idea bioinspired design and where they are applied in solving concurrent engineering problems						
Expected Course Outcome:						
<ul style="list-style-type: none">• Grow lateral thinking abilities• Respect for nature						
Student Learning Outcomes (SLO):	9 -Having problem solving ability- solving social issues and engineering problem					
Module:1 (Week 1)	Introduction and Overview	1 week	SLO: 9			
Introduction and overview, classic examples of bioinspired design (Velcro and bullet train), Biomimetics- History (da Vinci), and advent of bioinspired design, evolution (cosmic calendar)						
Module:2 (Week 2)	Nature's design principle	1 week	SLO: 9			
Design of Forms (Hexagonal unit cells, Intrinsic disorder, anisotropy), Design of materials (Hierarchy, fracture tough materials, structural colors, actuating materials), Design of functions (self-healing, self-assembly, additive manufacturing)						
Module:3 (Week 3)	Bioinspired Innovation	1 week	SLO: 9			
Bioinspired innovations in - Automotive and Automations (exoskeleton and bionic cars), Healthcare and sports (painless needles and dry adhesion), Communications (fog vision and electrolocation)						
Module:4 (Week 4)	Environment friendly solutions	1 week	SLO: 9			
Carbon Neutral Solutions (Coral Reefs, Eco-cements), Carbon Free Solutions (Lotus leaf inspired paints, super hydrophobic surfaces, omniphobic surfaces), eco-restorations (Permaculture, Circular Economy, Eco friendly pesticide)						
Module:5 (Week 5)	Sustainable development	1 week	SLO: 9			
Energy (Termite mound inspired shopping malls), Resource-Air (purification, filtration), Dew water collection systems, water purification, desalinations, Management of spaces, material and designs for megastructures.						
Text Book(s)						
1.		Biomimetics: Nature-Based Innovation By Yoseph Bar-Cohen, CRC Press, 2012				
Reference Books						
1.		Handbook of Biomimetics and Bioinspiration : Biologically-Driven Engineering of Materials, Processes, Devices, and Systems (In 3 Volumes) Edited by: Esmail Jabbari, Deok-Ho Kim,				

	Luke P Lee, Amir Ghaemmaghami, Ali Khademhosseini, Scientific Series in Nanoscience and Nanotechnology: Volumes 9, 2014
--	--