Indian Institute of Technology Guwahati Proposal for a New Course / Revision of a Course

Course Number & Title: BT 615 & Cell Signaling and Development		
L-T-P-C:3-0-0-6		
Type of Letter Grading (Regular Letter Grades / PP or NP Letter Grades): Regular Letter Grades		
Kind of Proposal (New Course / Revision of Existing Course): Revision of Existing Course		
Offered as (Compulsory / Elective):Electives		
Offered to: B Tech/M Tech/PhD		
Offered in (Odd/ Even / Any):Any		
Offered by (Name of Department/ Center):BSBE		
Pre-Requisite: Nil		
Preamble / Objectives (Optional): Cell signaling process is an integral part of the communication system in a biological system. Cell signaling plays a vital role in coordinating almost all biological processes such as growth, development, maintenance, disease, and defense. This course will help students in understanding complex network of various cell signaling mechanisms to explore its potential technological applications in diverse fields.		
Course Content/ Syllabus		
Introduction to cell signaling pathways and development in different model organisms; Evolutionary similarities of the cell signaling processes; Intracellular signaling pathways: G protein-coupled receptor (GPCR) signaling, protein kinases and phosphatases, second messengers; Cell -cell recognition and adhesion; Receptor -ligand interactions, coupling of receptors to different signaling machinery; Regulation of receptor function, modifications and adaptation of cells; Techniques for measuring intracellular concentrations of second messenger calcium ions, cellular roles of calcium, calcium homeostasis. Signaling and development: regulation of cell signaling, two-component system, homeotic genes, epigenetics, origin of the novelty, diseases caused by defect in signaling systems; Applications of cell signaling and developmental biotechnology in disease model, drug screening, product development. Books (In case UG compulsory courses, please give it as "Text books" and "Reference books". Otherwise give it as "References". Texts book and References: (Format: Authors, <i>Book Title in Italics font,</i> Volume/Series, Edition Number, Publisher Year)		
1. M. J. Berridge, Cell Signaling Biology, Portland Press, ISSN: 1749-7787, 2014		
 F. Marks, U. Klingmuller and K. Müller-Decker, Cellular signal processing: an introduction to molecular mechanisms of signal transduction, Garland Science; 1st Edition, 2008 		
3. G. Krauss, Biochemistry of signal transduction and regulation, Wiley-VCH; 3rd Edition, 2003		
 B. K. Hall and W. M. Olson (Eds.), Keywords and concepts in evolutionary developmental biology, Harvard University Press; 1st Edition, 2003. 		
5. B. Alberts, A. Johnson, J. Lewis, M. Raff, K. Roberts and P. Walter, Molecular biology of the cell. Garland Science; 4th Edition, 2002.		
6. R. K. Ockner, Integration of metabolism, energetics,and signal transduction, Springer; 1st Edition,2004		
7. F. H. Wilt and S. C. Hake, Principles of developmental biology, W. W. Norton & Co.; 1st		
Edition, 2004		

	Edition, 2003
9.	D. P. Kasbekar and K. McCluskey (Eds.), Neurospora: Genomics and molecular biology, Caister
	Academic Press; 1st Edition, 2013
10.	Hoffmeister, D. (Ed.), THE MYCOTA, Biochemistry and Molecular Biology, ISBN 978-3-319-27788-
	2, Springer, 2016