BT308 BIOENGINEERING

Instructor: Prof. Pranab Goswami
Prof. Bithiah Grace Jaganathan

Guest instructor: Prof. Eduardo Cortón

Session: Jan-May 2024

Syllabus

BT 308 Bioengineering 3-0-0-6

Introduction; General configuration of biosensor; Types of biosensors; Basic principle and instrumentation of different types of biosensors: electrochemical, optical, piezoelectric, magnetic and calorimetric biosensors; Advance materials and techniques for developing biosensors, diagnostics and therapeutics; Recent advances in bio-based sensors and diagnostics.

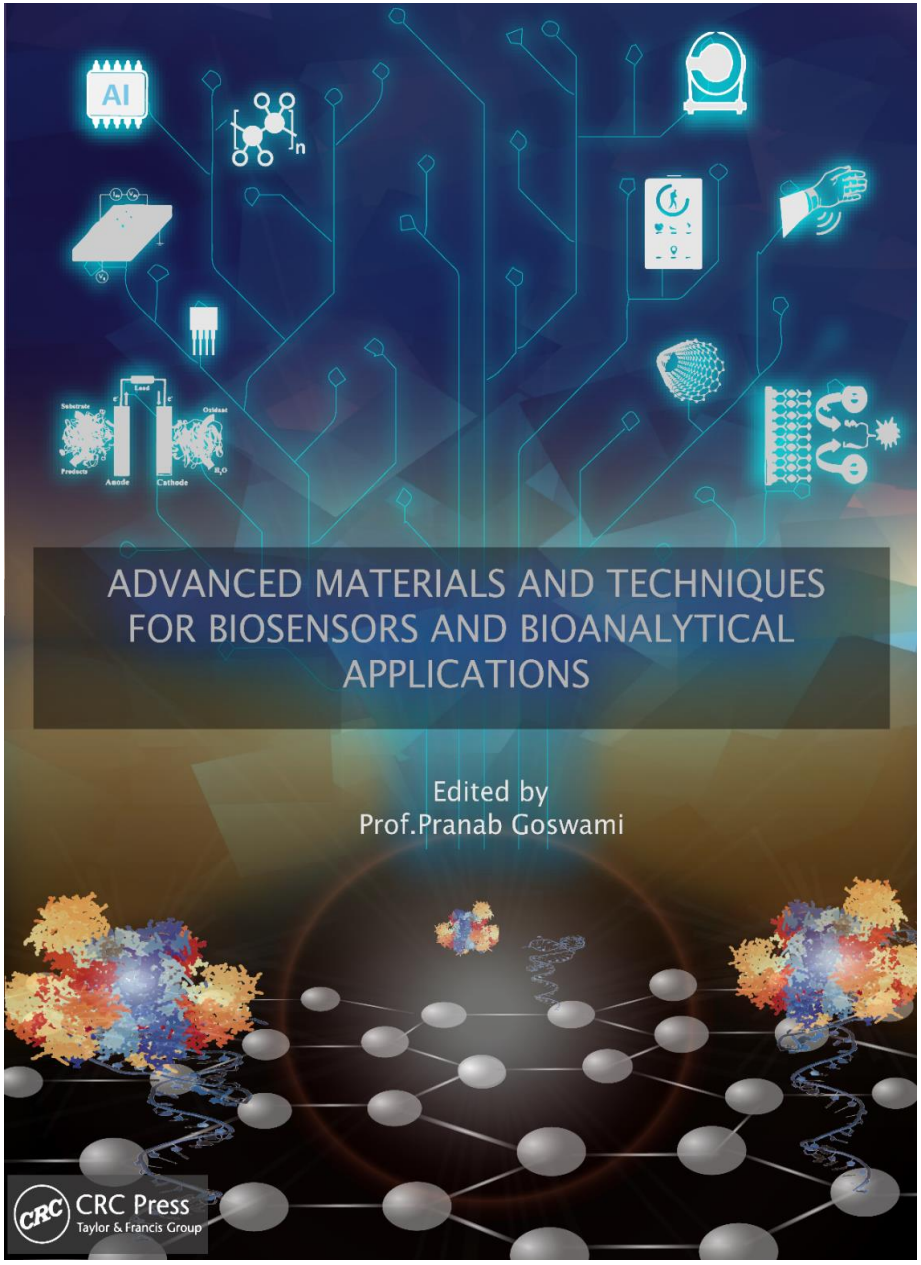
Introduction; Principles of regenerative medicine; Tissue engineering approaches, its need and current available technologies; Biomaterials in tissue engineering, biomaterial properties, biodegradability and compatibility; 3D scaffold processing techniques; Stem cells, primary cells and cell lines, their culturing and differentiation; Cell-material interactions; Bioreactors in tissue regeneration; 3D in vitro disease models; Drug delivery, drug delivery formats; Recent applications in regenerative medicine.

Texts:

1. L. Gorton, Biosensors and Modern Bio-Specific Analytical Techniques, Volume XLIV, Elsevier, 2005.
2. B. D. Malhotra and A. P. F. Turner, Advances in Biosensors, Volume V, Elsevier Science, 2003.
3. R. Lanza, R. Langer and J. P. Vacanti, The Principles of Tissue Engineering, 4th Edition, Academic Press, 2013.
4. R. Lanza and A. Atala, Essentials of Stem Cell Biology, 3rd Edition, Academic Press, 2013.
5. B. D. Ratner, A. S. Hoffman, F. J. Schoen and J. E. Lemons, Biomaterials Science: An Introduction to Materials and Medicine, 3rd Edition, Academic Press, 2012.
6. R. I. Freshney, Culture of Animal Cells: A Manual of Basic Technique and Specialized Applications, 6th Edition, Wiley-Blackwell, 2010.

References:

1. J. B. Park and J. D. Bronzino, Biomaterials: Principles and Applications, CRC Press, 2002.
2. K. C. Dee, D. A. Puleo and R. Bizios, An Introduction to Tissue-Biomaterial Interactions, Wiley, 2002.



https://www.amazon.com/Materials-Techniques-Biosensors-Bioanalytical-Applications/dp/0367539659

https://www.taylorfrancis.com/books/9781003083856

https://books.google.co.in/books/about/Advanced_Materials_and_Techniques_for_Bi.html?id=f3-JzQEACAAJ&redir_esc=y

https://drukkerijmiddelburg.nl/advanced-materials-and-techniques-for-biosensors-and-bioanalytical-applications-9780367539658

https://www.saxo.com/dk/advanced-materials-and-techniques-for-biosensors-a_pranab-goswami_hardback_9780367539658

EVALUATION

Total marks: 100

Marks covered upto midsem: 50

VIVA: 10 : 08 Feb (Thursday) 2024

Midsem: 40 : As per institute time table

(24th Feb-1st March 2024)

Endsem: : 29th April-5th May 2024

Marks covered after midsem: 50

Evaluation modality to be announced by Prof. Bithiah.

ADMINISTRATIVE MODALITY

- ✓ Attendance as per institute rule.
- ✓ Not allowed to exit the classroom once attendance is registered.
- ✓ No mobile phone and laptop allowed in the classes.

THANKS