

B.Sc. Biotechnology: Semester-V BST 504: Frontiers in Biotechnology	
Teaching Scheme Lectures: 3 hrs/Week Tutorials: 1 hr/Week Credits: 4	Examination Scheme Class Test -12Marks Teachers Assessment - 6Marks Attendance – 12 Marks End Semester Exam – 70 marks

Prerequisite: - BST302 Molecular Biology, BST503 Genomics and Proteomics, BST504 Bioprocess Technology

Course Objectives:

1. To give knowledge of key technologies and their applications to the study of human and model organism genomes.
2. To give complete knowledge of closely related areas of functional, structural and comparative genomics.
3. To explain the current state of expression, cell map and modular proteomics.
4. To explain Geo-Genomics and Human migrations, High throughput screening in genome for drug discovery, Pharmacogenetics and drug development.
5. To explain the concept of Stem cell technology and Nanotechnology

Course Outcomes:

After completing the course, students will be able to:

- CO1: To define Genetically modified food, plants and animals in brief, future goals in GM food crops and animals as well as biotechnology Commercial products: Insulin, Golden rice, BT Cotton etc.
- CO2: To understand mutation and its types, allele specific oligonucleotides, ARMS, oligonucleotide ligation and disease diagnosis with linked genetic markers
- CO3: To determine the concept of Micro RNA, Gene silencing and RNAi and fluorescently labeled DNA sequencing.
- CO4: To analyze the concept of stem cells technology: Definition, properties, proliferation, medical applications, ethical and legal issues in use of stem cells.
- CO5: To evaluate the principle of Nanotechnology, hybrid nanoparticles, smart drug delivery, biomolecule control, nanofluids, nanotechnology in medicine and biosensors.
- CO6: To explain Meeting of human populations & its genetic imprint; Detection of admixture (based on allele frequencies & DNA data); Y Chromosome & mitochondrial DNA markers in genealogical studies.
- CO7: To explain Geo-Genomics and Human migrations; Culture and human evolution: High throughput screening in genome for drug discovery-identification of gene targets, Pharmacogenetics and drug Development

Head

Department of Biotechnology
Invertis University, Bareilly (U.P.)

Dean

Faculty of Science
Invertis University, Bareilly (U.P.)

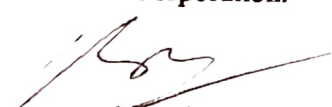
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Detailed syllabus :

UNIT-1 Genetically modified organisms Genetically modified organisms: Genetically modified food crops, food animals - examples and mode of production in brief. Future goals in GM food crops and animals, scientific valuation of public concerns, legal requirements in production of GMO Biotechnology Commercial products: Insulin, Golden rice, BT Cotton etc
UNIT-2 Human molecular medicine Human molecular medicine: Gene mutation, point mutation, allele specific oligonucleotides, ARMS, oligonucleotide ligation, disease diagnosis with linked genetic markers, fluorescently labeled DNA sequencing. Micro RNA, Gene silencing and RNAi, Stem cells technology: Definition, properties, proliferation, culture of stem cells, medical applications of stem cells, ethical and legal issues in use of stem cells. Nanotechnology: Introduction & definition, hybrid nanopracticles, smart drug delivery, biomolecule control, nanofluids, nanotechnology in medicine, Biosensors
UNIT-3 Human evolution Meeting of human populations & its genetic imprint; Detection of admixture (based on allele frequencies & DNA data); Y Chromosome & mitochondrial DNA markers in genealogical studies; Peopling of continents (Europe, Africa, Asia): Geo-Genomics and Human migrations; Culture and human evolution: High throughput screening in genome for drug discovery-identification of gene targets, Pharmacogenetics and drug development

Text and Reference Books:

1. The Cell - A molecular Approach, Geoffrey M. Cooper and Robert E. Hausman, ASM Press
2. Molecular Biology and Biotechnology, 4th Edn, J.M Walker and R. Rapley, Panima Books
3. Cell Biology, David. E. Sadava, Panima Books, Stem Cell Biology, Daniel Marshak, Richard L. Gardener and David Gottlieb, Cold Spring Harbour Laboratory Press
4. Environmental Microbiology, 2nd Edition, Ian L .Pepper and Charles P. Gerba, Elsevier Pub.
5. Environmental Biotechnology-Concepts and Application, Hans-Joachim Jordening and Jesefwinter - Wiley - VCH
6. Affinity Biosensors: Techniques and Protocols, K.R. Rogers and A. Mulchandani, Humana Press.
7. Biosensors and their Applicatrions, V.C. Yang and T.T. Ngo, Plenum Publishing Corporation.


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