**UNIVERSITY OF GONDAR**

**INSTITUTE OF BIOTECHNOLOGY**

**DEPARTMENT OF MEDICAL BIOTECHNOLOGY**

**COURSE OUTLINE**

**2018/19 Academic year**

**Course title:** Medical Biotechnology

**Course number**: Biot 645

**Credit:** 3 hours per week

**Instructor**: Dr. Nega Berhane

**Course objectives:-**

After the successful completion of this course students will be able to:

* Discuss the application of Molecular Biology for medicine
* Explain the Principle of Biotechnological tools, methods and different biochemicals used for medicine
* Explore the opportunities and challenges of Biotechnology in the application for medicine
* Differentiate among the different new types of Biotechnological drugs
* List and describe personalized medicine
* Explain the problems related to the delivery system of Gene therapy, stem cell therapy and other personalized medical approaches
* Described about genetically engineered animals

**Course content**

* Introduction to Medical biotechnology
* The molecular basis of disease
* Biotechnology and health care
* Gene therapy
* DNA vaccines
* Enzyme therapy
* Hormonal Therapy
* Cytokines
* Stem cell therapy
* Molecular Pharming
* Monoclonal Antibodies and cancer therapy
* The use of genetically engineered animals in Medical Biotechnology
* Biotechnological tools for disease diagnosis and therapy
* Different Biomedical techniques of medical biotechnology
* Opportunities of medical biotechnology for diagnosis and therapy
* Challenges of application of medical biotechnology in diagnosis and therapy
* Delivery problems
* Ethical issues in Medical Biotechnology

**Teaching strategies/methods:** Class room lectures, seminars, review leading scientific articles,group discussion, and practical sessions at microbial and molecular laboratories.

**Assessment criteria:** Written examinations, assignments, seminar presentation, review articlepresentation.

**Role of instructors and students:**

* **Instructors:** Deliver lecture, interactive learning, supervise assignments and exampapers.
* **Students:** Attend classes, active interactions in the class room and student presentation,intensive studies and preparation of assignments and reports, presentation of assignments as per the instruction of the instructors.

**Teaching support and input:**

1. **Teaching/Learning** 
   * White board
   * White board markers and dusters
   * Transparencies and overhead projector
   * Laptop and LCD projector
   * Video conference facility

**Reading Material**

1. Bernard R. Glick, Terry L. Delovitch, Cheryl L. Patten. Medical Biotechnology Washington, D.C.: ASM Press, 2014.
2. Mayer G. (2010). The Chemical Biology of Nucleic Acids. John Wiley & Sons, Ltd.
3. Fitzgerald-Hayes M. and Reichsman F: (2010). DNA and Biotechnology. 3rd ed. Academic Press, MA, USA
4. LeVine H. (2006). Genetic Engineering. 2nd ed. ABC-CLIO, Inc.
5. Clark D.P.and Pazdernik N.J. (2012). Biotechnology Academic Cell Update. Academic

Press, MA, USA.

1. Dale J.W. . (2012). From Genes to Genomes. Concepts and Applications of DNA

Technology. 3rd. ed. John Wiley & Sons, Ltd.

1. Hartwell L.H.. (2011). From Genes to Genomes. The McGraw-Hill Companies, Inc
2. Benecke, M. DNA typing in forensic medicine and in criminal investigations: a

current survey. Naturwissenschaften. 84:181–188, 1997

1. Foreman, L. A., Evett, I. W. Statistical analyses to support forensic interpretation

for a new ten-locus STR profiling system. Int. J. Leg. Med. 114:147–155, 2001.

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1. Gill, P. Role of short tandem repeat DNA in forensic casework in the UK past,present and future perspectives. Biotechniques. 32:366–372, 2002.
2. Hoyle, R. The FBI’s national database. Biotechnology. 16:987, 1998

Kafarowski, E., Lyon, A. M., Sloan, M. M. The retention and transfer of spermatozoa in clothing by machine washing. Can. Soc. Forensic Sci. J. 29:7–11, 1996