



# UNIVERSITY OF KASHMIR

## Department of Bio-Technology


### NOTES


#### Board of Undergraduate Studies in Biotechnology, Minutes thereof

A meeting of Board of Undergraduate Studies in Biotechnology was held on **01<sup>st</sup> Nov 2022** at **11:30am** in the department of Biotechnology. At the outset the Head of Department welcomed all the members and placed the agenda before the committee. The meeting was convened to finalize the pending Under Graduate syllabus (Major/Minor) strictly in accordance with NEP-2020. After thorough discussion it was resolved that

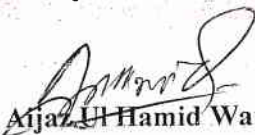
1. Syllabus for 2nd semester (Major) Biotechnology was introduced entitled Microbiology & Immunology.
2. Four units i.e; (i) Introduction to microbes ii) Microbial Growth iii) Immunology-I iv) Immunology-II
3. The contents of all the four units were thoroughly discussed. All the valuable suggestions were incorporated.
4. It was discussed that the emphasis should be given to basic concept in Microbiology and Immunology.
5. Skill based practicals were introduced in the course.


  
Prof. Raies Ahmad Qadri

  
Prof. Shajrul Amin


  
Dr. Mahboob Ul Hussain


  
Mr. Bilal Ahmad Reshi

  
Dr. Aijaz Ul Hamid Wani

  
Mrs. Sameena Ismail

  
Dr. Roohi Mushtaq

  
Mr. Muzaffer Ahmad Ahanger

  
Dr. Mohd Ashraf Khan

  
Dr. Shah Ubaidullah

  
Dr. Ajaz Ahmad Ganai

  
Dr. Niyaz Ahmad Naikoo

  
Head of Department  
(Biotechnology)

**Biotechnology 2<sup>nd</sup> Semester (Major)**

**Course: Microbiology and Immunology**

**CREDITS: THEORY- 4, PRACTICAL -2 (4+2)**

**Unit -1; Introduction to Microbes:** General structure of Bacterial cell (cell wall – Gram +ve and Gram -ve, flagella, bacterial chromosome, plasmid, cell inclusions). Gene transfer in bacteria (Transformation, conjugation, transduction). General structure of viruses (Capsid symmetry, enveloped and non-enveloped viruses) viral classification (RNA & DNA, positive & negative stranded viruses). Bacteriophages - lambda phage life cycle).

**Unit -2; Microbial Growth:** Nutritional requirements, Bacterial nutritional types (photolithoautotrophy, chemolithoautotrophy, photoorganoheterotrophy and chemoorganoheterotrophy). Growth curve - its phases, Growth kinetics. Factors affecting growth (solute and water activity, pH, temperature, oxygen concentration, pressure), Measurement of bacterial growth. Control of microbial growth (physical, chemical and antibiotics).

**Unit-3; Immunology I:** Innate Immune system, (Anatomical and physiological barriers). Hematopoiesis, Cells of myeloid and lymphoid system (Basophils, Neutrophils, Eosinophils, monocytes, T cells, B cells, NK cells, dendritic cells, mast cells). Phagocytosis and respiratory burst, Inflammation (clinical signs, initiators and mediators),. Organs of immune system – primary (bone marrow, thymus) secondary (lymph node, spleen, MALT). Lymph and lymphatic system. Host-pathogen interaction, Toll like Receptors, Basic concept of cytokines. Complement system – pathways.

**Unit-4; Immunology II: Antigens:** Nature and properties of antigen, Structure and types of antibodies, Primary and secondary immune response. Antigen processing and presentation. Mechanism of humoral immune response, Significance of Co-Stimulation. Mechanism of cell mediated immune response. Monoclonal antibodies – uses. Basic concept of vaccines.

**PRACTICAL (2 CREDITS)**

1. Preparation and sterilization of culture media for bacterial cultivation.
2. Culture Techniques: Streaking, Spreading etc.
3. Gram staining
4. Blood Smear Preparation and Staining
5. Total and differential Leukocyte count.
6. Total RBC count.
7. Blood grouping.
8. Field trips/subject tour (labs, institutes, industrial visit etc.,)

**BOOKS RECOMMENDED**

- General Microbiology: Stanier, R. Y., Ingraham, J. L., Wheelis, M. L. and Painter, P.R. –Macmillan Press Ltd., UK.
- Microbiology: An Introduction by Gerard Tortora, Berdell Funke, Christine Case, Derek Weber
- Microbiology: Pelczar, M.J., Chan, E. C.S. and Krieg, N.R. –McGraw-Hill.
- Kuby Immunology: Goldsby, R. A., Kindt, T. J., Osborne, B. A. and Kuby, J. - W.H.
- Cellular and Molecular Immunology by Abul Abbas, Andrew Lichtman, Shiv Pillai
- Textbook of Immunology: Seemi Farhat Basir, Prentice Hall India Learning Private Limited

*M. Reddy*

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