

| DEPARTMENT OF MICROBIOLOGY |                 |             |                      | CLASS: II B.Sc. Microbiology |                    |     |     |       |
|----------------------------|-----------------|-------------|----------------------|------------------------------|--------------------|-----|-----|-------|
| Sem                        | Course Type     | Course Code | Course Title         | Credits                      | Contact Hours/week | CIA | Ext | Total |
| IV                         | Major Practical | 20U4RMP4    | Major Practical – IV | 2                            | 3                  | 40  | 60  | 100   |

| Nature of Course    |   |  |                           |
|---------------------|---|--|---------------------------|
| Knowledge and skill |   |  | Employability oriented    |
| Skill oriented      | ✓ |  | Entrepreneurship oriented |

**Course Objectives:**

1. To understand and acquire a wide knowledge on immunity and immune system
2. To know different immunological techniques
3. To employ laboratory techniques that basically develop the pre-analytical, analytical and post analytical skills for the performance of the tests
4. To demonstrate the stages of bacterial growth
5. To identify the effects of factors on bacterial growth

**Course Learning Outcomes:**

*On successful completion of the programme, the students will be able to*

1. Demonstrate an understanding of the key concepts in immunology
2. Illustrate the salient features of antigen antibody reactions and their uses in diagnostics and various other studies
3. Apply scientific principles in the interpretation of immunological responses and data
4. Analyse bacterial growth stages
5. Demonstrate the effects of factors affecting bacterial growth

| S.No. | Experiments   |
|-------|---|
| 1.    | Study on blood cells - Identification of blood cells                  |
| 2.    | Total Leukocyte Count (TLC) of blood                                  |
| 3.    | Separation of serum and plasma from the blood sample (demonstration). |
| 4.    | Identification of human blood groups and Rh typing                    |
| 5.    | Widal test for typhoid fever  |
| 6.    | Immunodiffusion by Ouchterlony method                                 |
| 7.    | Radial Immuno Diffusion method  |
| 8.    | Immuno electrophoresis  |
| 9.    | Bacterial growth curve  |
| 10.   | Factors affecting bacterial growth curve – Temperature and pH         |

## Books for Reference

1. Carpenter D.L.(1975). Immunology and Serology. Third Edition. W.B. Saunders Company, London.
2. Garvey, J.S., Cremer, N.E. and Sussdorf, D.H. (1977). Methods in Immunology - A Laboratory Text for Instruction and Research. Third Edition. The Benjamin Cummings Publishing Company Advanced Book Program, London.
3. Hudson, L. and Hay, F.C. (1989). Practical Immunology. Third Edition. Blackwell scientific Publications, Oxford.
4. Myers, R.L. (1989). Immunology: A Laboratory Manual. Wm. C.Brown Publishers, Iowa.
5. Rastogi S.C. (1996). Immunodiagnostics Principles and Practice. New Age International (P) Ltd., New Delhi.
6. Talwar, G.P. (1983). A Hand Book of Practical Immunology. Vikas Publishing House Pvt. Ltd., New Delhi.
7. Talwar, G.P. and Gupta, S.K. (1992). A Hand Book of Practical and Clinical Immunology. Vol. 1 -2. CBS Publishers & Distributors, Delhi.
8. Turgeon, M.L. (1990). Immunology and Serology in Laboratory Medicine. The C.V. Mosby Company, Baltimore.

## Web Resources

1. <https://www.mechanobio.info> › Development
2. <https://www.ncbi.nlm.nih.gov/pmc/articles/PMC2581910>
3. <https://microbiologybook.org/mayer/ab-ag-rx.htm>
4. [https://www.ebi.ac.uk/interpro/potm/2005\\_2/Page2.htm](https://www.ebi.ac.uk/interpro/potm/2005_2/Page2.htm)
5. <https://www.nejm.org/medical-research/autoimmune-disease> Course Learning Outcomes (CLO)

## Rationale for nature of the course

Practical skills on immunological techniques help to understand and acquire a wide knowledge on immunity and immune system. It also provides wider knowledge on disease diagnosis and severity of infections. It helps to explore various growth stages of bacteria and the factors affecting bacterial growth.

## Activities having direct bearing on skill development/ employability/entrepreneurship

- Applying key concepts in antigen-antibody reaction for immunological diagnosis
- Employing scientific principles in the interpretation of immunological responses for devising treatment plan
- Demonstrating bacterial growth stages and identifying the factors affecting bacterial growth.

## Pedagogy

Demonstration and practical session.

## Course Learning Outcomes (CLO)

| CLOs | Course Learning Outcomes<br><i>On successful completion of the programme, the students will be able to</i>            | Knowledge Level |
|------|---|-----------------|
| CLO1 | Demonstrate an understanding of the key concepts in immunology  | Up to K1        |
| CLO2 | Illustrate the salient features of antigen antibody reactions and their uses in diagnostics and various other studies | Up to K2        |
| CLO3 | Apply scientific principles in the interpretation of immunological responses and data                                 | Up to K2        |
| CLO4 | Analyse bacterial growth stages   | Up to K3        |
| CLO5 | Demonstrate the effects of factors affecting bacterial growth   | Up to K2        |

K1 – Remembering and recalling facts with specific answers

K2 – Basic understanding of facts and stating main ideas with general answers

K3 – Application oriented – Solving Problems

K4 – Examining, analyzing, presentation and make interferences with evidences

### Mapping of Course Learning Outcome with Programme Specific Outcome

|      | PSO1 | PSO2 | PSO3 | PSO4 | PSO5 |
|------|------|------|------|------|------|
| CLO1 | 2    | 2    | 2    | 2    | 3    |
| CLO2 | 2    | 2    | 2    | 3    | 2    |
| CLO3 | 2    | 3    | 2    | 2    | 3    |
| CLO4 | 2    | 2    | 2    | 2    | 2    |
| CLO5 | 2    | 2    | 3    | 2    | 2    |

Advance application – 3,

Intermediate level – 2,

Basic level – 1.

### Mapping of course outcome with Programme outcome

|      | PO1 | PO2 | PO3 | PO4 | PO5 |
|------|-----|-----|-----|-----|-----|
| CLO1 | 2   | 2   | 3   | 2   | 2   |
| CLO2 | 2   | 3   | 2   | 2   | 2   |
| CLO3 | 2   | 2   | 3   | 3   | 2   |
| CLO4 | 3   | 3   | 2   | 2   | 3   |
| CLO5 | 2   | 2   | 2   | 2   | 2   |

Advance application – 3,

Intermediate level – 2,

Basic level – 1.

### Course designers:

1. Dr.P.N.Rajarajan

2. Mr.P.Sasi Kumar