



**INTEGRAL UNIVERSITY, LUCKNOW**  
INTEGRAL INSTITUTE OF ALLIED HEALTH SCIENCES & RESEARCH

**DEPARTMENT OF PARAMEDICAL SCIENCES**

**BACHELOR OF SCIENCE IN DIALYSIS  
TECHNOLGY  
(B. Sc. DT)**

**SYLLABUS**

**YEAR/ SEMESTER: II/III**



Integral University, Lucknow  
Department of Basic Medical Sciences  
Study and Evaluation Scheme

Program: B.Sc. Dialysis Technology

Semester-III

| S. N.            | Course code | Course Title                            | Type of Paper | Period Per hr/week/sem |           |           | Evaluation Scheme |            |            |            | Sub. Total  | Credit    | Total Credits |
|------------------|-------------|---|---------------|------------------------|-----------|-----------|-------------------|------------|------------|------------|-------------|-----------|---------------|
|                  |             |   |               | L                      | T         | P         | CT                | TA         | Total      | ESE        |             |           |               |
| <b>THEORIES</b>  |             |   |               |                        |           |           |                   |            |            |            |             |           |               |
| 1                | DT201       | Pathology                               | Core          | 2                      | 1         | 0         | 40                | 20         | 60         | 40         | 100         | 2:1:0     | 3             |
| 2                | DT202       | Microbiology                            | Core          | 2                      | 1         | 0         | 40                | 20         | 60         | 40         | 100         | 2:1:0     | 3             |
| 3                | DT203       | Medical Biochemistry -II                | Core          | 2                      | 1         | 0         | 40                | 20         | 60         | 40         | 100         | 2:1:0     | 3             |
| 4                | DT204       | Pharmacology                            | Core          | 2                      | 1         | 0         | 40                | 20         | 60         | 40         | 100         | 2:1:0     | 3             |
| 5                | DT205       | Immunology & Serology                   | Core          | 2                      | 1         | 0         | 40                | 20         | 60         | 40         | 100         | 2:1:0     | 3             |
| 6                | DT206       | Renal Dialysis Technology-I             | Core          | 2                      | 1         | 0         | 40                | 20         | 60         | 40         | 100         | 2:1:0     | 3             |
| <b>PRACTICAL</b> |             |   |               |                        |           |           |                   |            |            |            |             |           |               |
| 1                | DT207       | Immunology, Serology & Microbiology Lab | Core          | 0                      | 0         | 4         | 40                | 20         | 60         | 40         | 100         | 0:0:2     | 2             |
| 2                | DT208       | Pathology Lab                           | Core          | 0                      | 0         | 4         | 40                | 20         | 60         | 40         | 100         | 0:0:2     | 2             |
| 3                | DT209       | Medical Biochemistry -II Lab            | Core          | 0                      | 0         | 4         | 40                | 20         | 60         | 40         | 100         | 0:0:2     | 2             |
| <b>Total</b>     |             |   |               | <b>12</b>              | <b>06</b> | <b>16</b> | <b>400</b>        | <b>200</b> | <b>600</b> | <b>400</b> | <b>1000</b> | <b>26</b> | <b>26</b>     |

| S. N.            | Course code | Course Title                            | Type of Paper | Attributes    |                  |                   |                 |                              |             |                     | United Nation Sustainable Development Goal (SDGs) |
|------------------|-------------|---|---------------|---------------|------------------|-------------------|-----------------|------------------------------|-------------|---------------------|---|
|                  |             |   |               | Employability | Entrepreneurship | Skill Development | Gender Equality | Environment & Sustainability | Human Value | Professional Ethics |   |
| <b>THEORIES</b>  |             |   |               |               |                  |                   |                 |                              |             |                     |   |
| 1                | DT201       | Pathology                               | Core          | √             | √                | √                 | √               |                              | √           | √                   | 3,4   |
| 2                | DT202       | Microbiology                            | Core          | √             | √                | √                 | √               |                              | √           | √                   | 3,4   |
| 3                | DT203       | Medical Biochemistry -II                | Core          | √             | √                | √                 | √               |                              | √           | √                   | 3,4   |
| 4                | DT204       | Pharmacology                            | Core          | √             | √                | √                 | √               |                              | √           | √                   | 3,4   |
| 5                | DT205       | Immunology & Serology                   | Core          | √             | √                | √                 | √               |                              | √           | √                   | 3,4   |
| 6                | DT206       | Renal Dialysis Technology-I             | Core          |               |                  | √                 |                 | √                            |             |                     | 3,4   |
| <b>PRACTICAL</b> |             |   |               |               |                  |                   |                 |                              |             |                     |   |
| 1                | DT207       | Immunology, Serology & Microbiology Lab | Core          | √             | √                | √                 | √               |                              | √           | √                   | 3,4   |
| 2                | DT208       | Pathology Lab                           | Core          | √             | √                | √                 | √               |                              | √           | √                   | 3,4   |
| 3                | DT209       | Medical Biochemistry -II Lab            | Core          | √             | √                | √                 | √               |                              | √           | √                   | 3,4   |

**L:** Lecture      **T:** Tutorials      **P:** Practical      **CT:** Class Test      **TA:** Teacher Assessment      **ESE:** End Semester Examination,  
**AE=** Ability enhancement, **DSE-** Discipline Specific Elective, **Sessional Total:** Class Test + Teacher Assessment      **Subject Total:** Sessional Total + End Semester Examination





## Integral University, Lucknow

|  |   |                            |                     |          |          |          |          |
|--|---|----------------------------|---------------------|----------|----------|----------|----------|
| <b>Effective from Session: 2024-25</b> |   |                            |                     |          |          |          |          |
| <b>Course Code</b>                     | <b>DT202</b>  | <b>Title of the Course</b> | <b>MICROBIOLOGY</b> | <b>L</b> | <b>T</b> | <b>P</b> | <b>C</b> |
| <b>Year</b>                            | <b>II</b>   | <b>Semester</b>            | <b>III</b>          | <b>2</b> | <b>1</b> | <b>0</b> | <b>3</b> |
| <b>Pre-Requisite</b>                   | <b>Nil</b>  | <b>Co-requisite</b>        | <b>Nil</b>          |          |          |          |          |
| <b>Course Objectives</b>               | This subject gives a general insight into the history, basics of microbiology and imparts knowledge about equipment used in microbiology. |                            |                     |          |          |          |          |

| Course Outcomes |  |
|-----------------|--|
| <b>CO1</b>      | This course makes the students to know handling of instruments and sterilization techniques.   |
| <b>CO2</b>      | This course makes the students to know general insight into the history, basics of microbiology.   |
| <b>CO3</b>      | This course makes the students to know imparts knowledge about equipment used in microbiology.   |
| <b>CO4</b>      | This course makes the students to know Structure, function and chemical composition of bacterial cell membranes.   |
| <b>CO5</b>      | This course makes the students to know Biomedical waste management in a Medical Microbiology laboratory: Types of the waste generated, Segregation, Treatment, Disposal. |

| Unit No. | Title of the Unit                               | Content of Unit   | Contact Hrs. | Mapped CO |
|----------|---|---|--------------|-----------|
| 1        | <b>INTRODUCTION AND HISTORY OF MICROBIOLOGY</b> | <ul style="list-style-type: none"> <li>Development of microbiology as a discipline, Contributions of Anton von Leeuwenhoek, Louis Pasteur, Robert Koch, Joseph Lister, Alexander Fleming, Edward Jenner.</li> <li>Introduction to bacterial taxonomy, Classification of Bacteria, Morphology based on size, shape, arrangement, motility, flagella, spores, capsules, cell wall, plasma membrane, pili, ribosomes.</li> </ul>   | 6            | CO1       |
| 2        | <b>MICROSCOPY</b>                               | <ul style="list-style-type: none"> <li>Microscopy: Study of compound microscope– magnification, numerical aperture resolution and components of microscope.</li> <li>Dark ground illumination, care of microscope and common difficulties micrometry.</li> <li>Bright Field Microscope, Dark Field Microscope, Phase Contrast Microscope, Fluorescence Microscope, Transmission Electron Microscope, Scanning Electron Microscope, Confocal Microscope.</li> </ul>  | 6            | CO2       |
| 3        | <b>STRUCTURE OF BACTERIA</b>                    | <ul style="list-style-type: none"> <li>Cell size, shape and arrangement, cell-wall, composition and detailed structure of Gram-positive and Gram-negative cell walls, Cell Membrane.</li> <li>Structure, function and chemical composition of bacterial cell membranes.</li> <li>Cytoplasm: Ribosome, mesosomes, inclusion bodies, nucleoid, chromosome and plasmids Endospore: Structure, formation, Bacterial Genetics.</li> </ul>  | 6            | CO3       |
| 4        | <b>STERILIZATION AND DISINFECTION</b>           | <ul style="list-style-type: none"> <li>General safety measures used in Microbiology laboratory.</li> <li>Sterilization and disinfection: Various physical methods of sterilization heat.</li> <li>UV radiation, ionizing radiation, filtration, characters affecting sterilization, autoclave control and sterilization indicators.</li> <li>Biomedical waste management in a Medical Microbiology laboratory: Types of the waste generated, Segregation, Treatment, Disposal, PPE &amp; infection prevention Control.</li> </ul> | 6            | CO4       |
| 5        | <b>ANTISEPTICS AND DISINFECTANTS</b>            | <ul style="list-style-type: none"> <li>Antiseptics &amp; Disinfectants: Definition, types and properties, mode of action, use, qualities of good disinfectants.</li> <li>Chemical disinfectants – phenol and its compounds, alcohol, halogen, heavy metals and quaternary ammonium compounds, aldehyde, gaseous compound use and abuse of disinfectants. precautions while using the disinfectants, Testing of disinfectants.</li> </ul>  | 6            | CO5       |

**Reference Books:**

- Ananthanarayan R. and Paniker C.K.J. (2009) Textbook of Microbiology. 8th edition, University Press Publication.
- Brooks G.F., Carroll K.C., Butel J.S., Morse S.A. and Mietzner, T.A. (2013).
- Adelberg's Medical Microbiology. 26th edition. McGraw Hill Publication.
- Willey JM, Sherwood LM, and Woolverton CJ. (2013) Prescott, Harley and Klein's Microbiology. 9th edition. McGraw Hill Higher Education.
- Goldsby RA, Kindt TJ, Osborne BA. (2007). Kuby's Immunology. 6th edition W.H. Freeman and Company, New York.

**e-Learning Source:**

- [https://www.babcock.edu.ng/oer/lecture\\_notes/mlsc/MLSC%20417%20HISTORY%20OF%20MICROBIOLOGY.ppt](https://www.babcock.edu.ng/oer/lecture_notes/mlsc/MLSC%20417%20HISTORY%20OF%20MICROBIOLOGY.ppt)
- [https://www.tru.ca/\\_shared/assets/Microbiology\\_Lab\\_Safety39696.pdf](https://www.tru.ca/_shared/assets/Microbiology_Lab_Safety39696.pdf)
- <https://www.healthline.com/health/what-is-antiseptic>

| Course Articulation Matrix: (Mapping of COs with POs and PSOs) |     |     |     |     |     |     |     |     |     |      |      |      |      |      |      |      |      |
|--|-----|-----|-----|-----|-----|-----|-----|-----|-----|------|------|------|------|------|------|------|------|
| PO-PSO CO  | PO1 | PO2 | PO3 | PO4 | PO5 | PO6 | PO7 | PO8 | PO9 | PO10 | PO11 | PO12 | PSO1 | PSO2 | PSO3 | PSO4 | PSO5 |
| <b>CO1</b>   | 1   | 3   | 2   | 2   | -   | -   | -   | 1   | 2   | -    | -    | 2    | 3    | 1    | 2    | 3    | -    |
| <b>CO2</b>   | 1   | 3   | 1   | 3   | -   | -   | -   | 2   | 3   | -    | -    | 3    | 3    | -    | 1    | 2    | -    |
| <b>CO3</b>   | 1   | 3   | 1   | 2   | -   | -   | -   | 1   | 2   | -    | -    | 2    | 2    | 2    | 1    | 2    | 2    |
| <b>CO4</b>   | 1   | 3   | 1   | 2   | -   | -   | -   | 1   | 3   | 1    | -    | 3    | 2    | 3    | 1    | 3    | 2    |
| <b>CO5</b>   | 1   | 3   | 1   | 2   | -   | -   | -   | 1   | 2   | 2    | -    | 2    | 3    | 1    | 2    | 2    | 2    |

**1- Low Correlation; 2- Moderate Correlation; 3- Substantial Correlation Attributes & SDGs**

| Course Code  | Course Title        | Attributes    |                  |                   |                 |                              |             |                     | SDGs No.   |
|--------------|---------------------|---------------|------------------|-------------------|-----------------|------------------------------|-------------|---------------------|------------|
|              |                     | Employability | Entrepreneurship | Skill Development | Gender Equality | Environment & Sustainability | Human Value | Professional Ethics |            |
| <b>DT202</b> | <b>MICROBIOLOGY</b> | <i>r</i>      | <i>r</i>         | <i>r</i>          | <i>r</i>        |                              |             |                     | <b>3,4</b> |





## Integral University, Lucknow

|  |   |                            |                     |  |  |  |          |          |          |          |
|--|---|----------------------------|---------------------|--|--|--|----------|----------|----------|----------|
| <b>Effective from Session: 2024-2025</b> |   |                            |                     |  |  |  |          |          |          |          |
| <b>Course Code</b>                       | <b>DT204</b>  | <b>Title of the Course</b> | <b>PHARMACOLOGY</b> |  |  |  | <b>L</b> | <b>T</b> | <b>P</b> | <b>C</b> |
| <b>Year</b>                              | <b>II</b>   | <b>Semester</b>            | <b>III</b>          |  |  |  | <b>3</b> | <b>1</b> | <b>0</b> | <b>4</b> |
| <b>Pre-Requisite</b>                     | <b>Nil</b>  | <b>Co-requisite</b>        | <b>Nil</b>          |  |  |  |          |          |          |          |
| <b>Course Objectives</b>                 | The course will provide training in general pharmacology with special emphasis on common drugs used, routes of ministration, types of formulations, dose and frequency of administration, side effects and toxicity, management of toxic effects, drug interactions, knowledge of chemical and trade name, importance of manufacturing and expiry dates and instructions for handling of drugs. |                            |                     |  |  |  |          |          |          |          |

|   |   |
|---|---|
| <b>Course Outcomes:</b> After the successful course completion, learners will develop following attributes: |   |
| <b>CO1</b>  | General Pharmacology & ANS: Possess a relevant knowledge in basic principles of pharmacology and its recent advances.                                     |
| <b>CO2</b>  | Autacoids, PNS & Resp. System: Understand the basic pharmacology of common drugs used, their importance in the overall treatment including Physiotherapy. |
| <b>CO3</b>  | CVS, GIT & Miscellaneous: Understand the general principles of drug action and the handling of drugs by the body.   |
| <b>CO4</b>  | CNS & Hormones: Understand the contribution of both drug and physiotherapy factors in the outcome of treatment  |
| <b>CO5</b>  | Anti - Microbial Agents: Learn the various drugs such as Anti-leprotic& Anti-fungal Drugs, Anti-malarial Drugs, Anti-tubercular Drugs                     |

| Unit No. | Title of the Unit                           | Content of Unit  | Contact Hrs. | Mapped CO |
|----------|---|--|--------------|-----------|
| 1        | GENERAL PHARMACOLOGY                        | Introduction to pharmacology-various terminologies-sources & routes of drug administration-Absorption & Factors modifying drug absorption – Distribution of drugs- Metabolism: Phase II, - Excretion: routes, modes & kinetics of elimination-Excretion- Mechanism of drug action in brief, synergism & antagonism and Factors modifying drug action-Adverse drug reactions-ADR reporting & monitoring – Drug interactions.  | 8            | CO1       |
| 2        | CENTRAL NERVOUS SYSTEM & RESPIRATORY SYSTEM | Introduction to CNS and Neurotransmitters, drugs used in insomnia, Sedatives and hypnotics-diazepam-alprazolam, anti-anxiety drugs, Antiepileptic-phenytoin, carbamazepine, sodium valproate, General Anesthetics – halothane, isoflurane, sevoflurane – Local Anesthetics – lignocaine – list of other drugs, Alcohols – ethyl alcohol –disulfuram, Anti parkinsonians – levodopa – carbidopa, Opioids – morphine – naloxone – tramadol – pentazocine, NSAIDs – aspirin – diclofenac – ibuprofen – paracetamol – Cox 2 inhibitors. Drugs used in bronchial asthma and cough   | 8            | CO2       |
| 3        | CARDIO VASCULAR SYSTEM & BLOOD              | Drugs used in ischemic heart disease-nitrates-Calcium channel blockers-nifedipine, verapamil-list of other drugs – Beta blockers – propranolol, atenolol – metoprolol and antiplatelets – aspirin, clopidogrel, and names of other drugs-fibrinolytic drugs-streptokinase and other drugs, Drugs used in CCF-digoxin and list of other drugs useful in CCF, Shock. Diuretics: 4 groups – Thiazides, Loop diuretics, Potassium sparing and osmotic diuretics. Hypertension – outline of drugs used in hypertension, Rennin angiotensin system – ACE inhibitors – captopril, ramipril and names of other drugs – Receptor antagonist – losartan and list of other drugs, Antiarrhythmic drugs-classification – Quinidine, Lignocaine and amiodaron – Drugs for Hypercholesterolemia – statins. Drugs for anemia – oral & parenteral iron preparations, folic acid, vit B12 and erythropoietin. Coagulants and anticoagulants   | 8            | CO3       |
| 4        | HORMONES AND GIT                            | Contraceptives – oral and injectable, Corticosteroids – glucocorticoids – hydrocortisone-prednisolone-dexamethasone and names of topical steroids – Insulin – Oral hypoglycemic –sulphonyl urea’s, biguanides and others, Thyroid and Antithyroid drugs, Sex Hormones-Estrogen and antiestrogens, Progestin and Anti progestin’s, Androgen And anti-androgens. Emetics and anti-emetics-metoclopramide and domperidone, Drugs used in peptic ulcer, constipation-lactulose & Diarrhea-ORS-Loperamide.  | 8            | CO4       |
| 5        | CHEMOTHERAPY AND MISCELLANEOUS              | Introduction – Beta lactum antibiotics: Penicillin’s – natural, semi synthetic penicillin’s – amoxicillin – cloxacillin-clauvulinic acid – sulbactam – Cephalosporin’s – cephalixin – cefuroxime – cefixime –ceftriaxone-cefepime, Broad spectrum antibiotics – Doxycycline – chloramphenicol-imipenem-Macrolides – erythromycin, azithromycin and others – Quinolones- ciprofloxacin and list of other drugs and sulfonamides- cotrimoxazole-Amino glycosides-gentamycin, amikacin and names of other drugs Anti TB-first line drugs, Anti leprosy-dapsone and clofazimine Anti-malarial- chloroquine-mefloquine and artemisinin, Anti-fungal- amphotericin B- fluconazole and topical drugs & Anti viral drugs- acyclovir and anti-HIV, Anti protozoals- metronidazole – Anthelmintics- albendazole-praziquantel.<br>Anti-cancer drugs-Introduction – Anti metabolites- methotrexate- 6 mercapto purine- Alkylating agents- cyclophosphamide- busulphan and cisplatin – Plant products- vinblastin- vincristine-taxanes, antibiotics-actinomycin D- monoclonal antibodies. Immuno modulators- cyclosporine, tacrolimus, azathioprine and steroids. | 8            | CO5       |

**Reference Books:**

1. Dr. K.D. Tripathi Jaypee, Essential of Medical Pharmacology, Brothers Medical Publishers.
2. Gaddum Gaddum’s Pharmacology
3. Dr. R.S. Satoskar & Dr. S.D. Bhandarkar, Pharmacology & Pharmacotherapeutics Revised 19<sup>th</sup> Edition 2005 by Popular Prakashan
4. Krantz, & Carr, Pharmacology principle of Medical practice, Williams & Wilkins.
5. Goodman Pharmacological basis of Therapeutics, L. S. Gilman A

**e-Learning Source:**

1. <https://youtu.be/a0lWFQvQKw8>
2. <https://youtu.be/qhiMmNzjHRg>
3. <https://youtu.be/-znHCAu5OnY>
4. <https://youtu.be/t2tKyjj7u5Y>

**Course Articulation Matrix: (Mapping of COs with POs and PSOs)**

| PO-PSO<br>CO | Course Articulation Matrix: (Mapping of COs with POs and PSOs) |     |     |     |     |     |     |     |     |      |      |      |      |      |      |      |      |
|--------------|--|-----|-----|-----|-----|-----|-----|-----|-----|------|------|------|------|------|------|------|------|
|              | PO1  | PO2 | PO3 | PO4 | PO5 | PO6 | PO7 | PO8 | PO9 | PO10 | PO11 | PO12 | PSO1 | PSO2 | PSO3 | PSO4 | PSO5 |
| CO1          | 2  | 3   | -   | -   | -   | -   | -   | -   | -   | -    | -    | 1    | 3    | -    | 1    | -    | 2    |
| CO2          | 3  | 3   | -   | -   | -   | 2   | -   | -   | -   | -    | -    | -    | 3    | 3    | 2    | 3    | 3    |
| CO3          | 2  | 3   | -   | -   | -   | 2   | -   | -   | -   | -    | -    | 1    | 3    | 2    | 1    | 3    | 2    |
| CO4          | 3  | 3   | -   | -   | -   | -   | -   | -   | -   | -    | -    | -    | 2    | 3    | 2    | 2    | 3    |
| CO5          | 3  | 3   | -   | -   | -   | 3   | -   | 1   | -   | -    | -    | -    | 3    | 3    | 2    | 3    | 3    |

1-Low Correlation; 2- Moderate Correlation; 3- Substantial Correlation Attributes & SDGs

| Course Code | Course Title | Attributes    |                  |                   |                 |                              |             |                     | SDGs No. |
|-------------|--------------|---------------|------------------|-------------------|-----------------|------------------------------|-------------|---------------------|----------|
| DT204       | PHARMACOLOGY | Employability | Entrepreneurship | Skill Development | Gender Equality | Environment & Sustainability | Human Value | Professional Ethics | 3,4      |
|             |              | √             | √                | √                 |                 |                              | √           | √                   |          |



**Integral University, Lucknow**

**Effective from Session: 2024-25**

|                          |   |                            |                                  |          |          |          |          |
|--------------------------|---|----------------------------|----------------------------------|----------|----------|----------|----------|
| <b>Course Code</b>       | <b>DT205</b>  | <b>Title of the Course</b> | <b>IMMUNOLOGY &amp; SEROLOGY</b> | <b>L</b> | <b>T</b> | <b>P</b> | <b>C</b> |
| <b>Year</b>              | <b>II</b>   | <b>Semester</b>            | <b>III</b>                       | <b>2</b> | <b>1</b> | <b>0</b> | <b>3</b> |
| <b>Pre-Requisite</b>     | <b>Nil</b>  | <b>Co-requisite</b>        | <b>Nil</b>                       |          |          |          |          |
| <b>Course Objectives</b> | This course has been formulated to impart basic aspects of immunity, antigens, antibodies, various serological reactions, techniques and their utility in laboratory diagnosis of human diseases. |                            |                                  |          |          |          |          |

**Course Outcomes:** After the successful course completion, learners will develop following attributes:

|            |  |
|------------|--|
| <b>CO1</b> | The students will learn scientific approaches/techniques that are used to investigate various diseases, historical background, general concepts of the immune system   |
| <b>CO2</b> | The students will learn scientific approaches/techniques that are used to investigate Antigens and haptens: Properties, foreignness, molecular size, heterogeneity, B and T cell epitopes; T dependent and T independent antigens. |
| <b>CO3</b> | The students will learn scientific approaches/techniques that are used to investigate Mechanism of humoral and cell mediated immune response...  |
| <b>CO4</b> | The students will learn scientific approaches/techniques that are used to investigate Laboratory tests for demonstration of antigen antibody reaction such as agglutination, precipitation, ELISA, RIA, Immune of fluorescence.    |
| <b>CO5</b> | The students will learn scientific approaches/techniques that are used to investigate Rheumatologic diseases, etiology and pathogenesis and lab investigations.  |

| Unit No. | Title of the Unit                             | Content of Unit   | Contact Hrs. | Mapped CO |
|----------|---|---|--------------|-----------|
| 1        | <b>INTRODUCTION AND HISTORY OF IMMUNOLOGY</b> | <ul style="list-style-type: none"> <li>Historical background, general concepts of the immune system, innate and adaptive immunity; active and passive immunity; primary and secondary immune response.</li> <li>Cell and organs of immune system, Phagocytosis.</li> </ul>  | 6            | CO1       |
| 2        | <b>ANTIGENS AND ANTIBODY</b>                  | <ul style="list-style-type: none"> <li>Antigens and haptens: Properties, foreignness, molecular size, heterogeneity, B and T cell epitopes; T dependent and T independent antigens.</li> <li>Antibodies: Historical perspective of antibody structure; structure, function and properties of the antibodies; different classes, subclasses and biological activities of antibodies; concepts of antibody diversity.</li> <li>Introduction &amp; mechanism of hybridoma technology, monoclonal antibodies, polyclonal antibody.</li> </ul> | 6            | CO2       |
| 3        | <b>IMMUNE RESPONSE, MHC AND COMPLEMENT</b>    | <ul style="list-style-type: none"> <li>Mechanism of humoral and cell mediated immune response</li> <li>Introduction of Major Histocompatibility Complex, organization of MHC and inheritance in humans; Antigen presenting cells, antigen processing and presentation.</li> <li>Complement system and complement fixation test.</li> </ul>  | 6            | CO3       |
| 4        | <b>ANTIGEN-ANTIBODY REACTION</b>              | <ul style="list-style-type: none"> <li>Laboratory tests for demonstration of antigen antibody reaction such as agglutination, precipitation, ELISA, RIA, immune of fluorescence, PCR</li> </ul>   | 6            | CO4       |
| 5        | <b>RHEUMATOLOGICAL DISORDERS</b>              | <ul style="list-style-type: none"> <li>Rheumatological diseases, etiology and pathogenesis and lab investigations, vaccine production and vaccination schedule.</li> </ul>  | 6            | CO5       |

**Reference Books:**

1. Abbas AK, Lichtman AH, Pillai S. (2007). Cellular and Molecular Immunology, 6th edition Saunders Publication, Philadelphia.
2. Goldsby RA, Kindt TJ, Osborne BA. (2007). Kuby's Immunology. 6th edition W.H. Freeman and Company, New York.
3. Murphy K, Travers P, Walport M. (2008). Janeway's Immunobiology, 7th edition Garland Science Publishers, New York.
4. Delves P, Martins, Burton D, Roitt IM. (2006). Roitt's Essential Immunology, 11th edition Wiley- Blackwell Scientific Publication, Oxford.

**e-Learning Source:**

1. [https://en.wikipedia.org/wiki/Immune\\_system](https://en.wikipedia.org/wiki/Immune_system)
2. <https://www.creative-diagnostics.com/blog/index.php/immunogen-antigen-hapten-epitope-and-adjuvant/>
3. <https://www.webmd.com/rheumatoid-arthritis/an-overview-of-rheumatic-diseases>

**Course Articulation Matrix: (Mapping of COs with POs and PSOs)**

| PO-PSO CO  | Course Articulation Matrix: (Mapping of COs with POs and PSOs) |     |     |     |     |     |     |     |     |      |      |      |      |      |      |      |      |
|------------|--|-----|-----|-----|-----|-----|-----|-----|-----|------|------|------|------|------|------|------|------|
|            | PO1  | PO2 | PO3 | PO4 | PO5 | PO6 | PO7 | PO8 | PO9 | PO10 | PO11 | PO12 | PSO1 | PSO2 | PSO3 | PSO4 | PSO5 |
| <b>CO1</b> | 1  | 3   | 2   | 2   | -   | -   | -   | 1   | 2   | 1    | -    | 2    | 2    | 1    | -    | 1    | -    |
| <b>CO2</b> | 1  | 3   | 1   | 3   | -   | -   | -   | 2   | 3   | -    | -    | 3    | 3    | 2    | -    | 2    | -    |
| <b>CO3</b> | 1  | 3   | 1   | 2   | -   | -   | -   | 1   | 2   | 2    | -    | 2    | 3    | 1    | -    | 1    | -    |
| <b>CO4</b> | 1  | 3   | 1   | 2   | -   | -   | -   | 1   | 3   | -    | -    | 3    | 2    | 1    | -    | 1    | -    |
| <b>CO5</b> | 1  | 3   | 1   | 2   | -   | -   | -   | 1   | 2   | 1    | -    | 2    | 2    | 1    | -    | 1    | -    |

**1-Low Correlation; 2- Moderate Correlation; 3- Substantial Correlation** Attributes & SDGs

| Course Code | Course Title              | Attributes    |                  |                   |                 |                              |             |                     | SDGs No. |
|-------------|---------------------------|---------------|------------------|-------------------|-----------------|------------------------------|-------------|---------------------|----------|
| DT205       | IMMUNOLOGY & SEROLOGY - I | Employability | Entrepreneurship | Skill Development | Gender Equality | Environment & Sustainability | Human Value | Professional Ethics | 3,4      |
|             |                           | ✓             | ✓                | ✓                 | ✓               |                              | ✓           | ✓                   |          |
|             |                           |               |                  |                   |                 |                              |             |                     |          |









## Integral University, Lucknow

|  |              |                            |                      |          |          |          |          |
|--|--------------|----------------------------|----------------------|----------|----------|----------|----------|
| <b>Effective from Session: 2024-25</b> |              |                            |                      |          |          |          |          |
| <b>Course Code</b>                     | <b>DT208</b> | <b>Title of the Course</b> | <b>PATHOLOGY LAB</b> | <b>L</b> | <b>T</b> | <b>P</b> | <b>C</b> |
| <b>Year</b>                            | <b>II</b>    | <b>Semester</b>            | <b>III</b>           | <b>0</b> | <b>0</b> | <b>4</b> | <b>2</b> |
| <b>Pre-Requisite</b>                   | <b>Nil</b>   | <b>Co-requisite</b>        | <b>Nil</b>           |          |          |          |          |
| <b>Course Objectives</b>               |              |                            |                      |          |          |          |          |

| Course Outcomes |   |
|-----------------|---|
| <b>CO1</b>      | Students will be able to learn about Glasswares used in histopathology lab, alcohol preparation, formalin preparation |
| <b>CO2</b>      | Students will be able to learn about honing and stopping technique, grossing of tissue, tissue processing             |
| <b>CO3</b>      | Students will be able to learn about section cutting techniques, smear fixation techniques                            |
| <b>CO4</b>      | Students will be able to learn about H & E staining techniques  |
| <b>CO5</b>      | Students will be able to learn about mounting and preservation of slides  |

| Unit No. | Title of the Unit            | Content of Unit   | Contact Hrs. | Mapped CO |
|----------|------------------------------|---|--------------|-----------|
| 1        | <b>GLASSWARE</b>             | 1. Demonstration of glass wares and equipment used in histopathology lab. | 60           | CO1       |
| 2        | <b>ALCOHOL PREPARATION</b>   | 2. To prepare alcohol of different concentration.                         |              | CO1       |
| 3        | <b>FORMALIN PREPARATION</b>  | 3. To prepare formalin from stock solution.                               |              | CO2       |
| 4        | <b>HONING AND STOPPING</b>   | 4. To sharp knife by honing and stropping.                                |              | CO2       |
| 5        | <b>GROSSING OF TISSUE</b>    | 5. Grossing of tissue.  |              | CO3       |
| 6        | <b>TISSUE PROCESSING</b>     | 6. To perform tissue processing by manual method.                         |              | CO3       |
| 7        | <b>SECTION CUTTING</b>       | 7. To perform section cutting of paraffin embedded tissue.                |              | CO4       |
| 8        | <b>SMEAR FIXATION</b>        | 8. To fix the smear on glass slide.                                       |              | CO4       |
| 9        | <b>H &amp; E STAINING</b>    | 9. To perform hematoxylin and eosin staining                              |              | CO5       |
| 10       | <b>PRESERVATION OF SLIDE</b> | 10. Mounting and preservation of slide                                    |              | CO5       |

|  |  |
|--|--|
| <b>Reference Books:</b>  |  |
| 1. Bancroft's Theory and Practice of Histological Techniques, 7th Edition, Elsevier Publications   |  |
| 2. CFA Culling, (1974), Handbook of Histopathological and Histochemical techniques: Including Museum Techniques, 3rd edition, Butter worth publishers.   |  |
| <b>e-Learning Source:</b>  |  |
| 1. <a href="https://www.slideshare.net/DJASMINEPRIYA/histopathology-introduction">https://www.slideshare.net/DJASMINEPRIYA/histopathology-introduction</a>   |  |
| 2. <a href="https://www.ijohsjournal.org/article.asp?issn=2231-6027;year=2018;volume=8;issue=2;page=63;epage=67;aulast=Theresa">https://www.ijohsjournal.org/article.asp?issn=2231-6027;year=2018;volume=8;issue=2;page=63;epage=67;aulast=Theresa</a> |  |
| 3. <a href="https://www.slideshare.net/VarugheseGeorge/hematoxylin-and-eosin-staining-67250220">https://www.slideshare.net/VarugheseGeorge/hematoxylin-and-eosin-staining-67250220</a>   |  |

| Course Articulation Matrix: (Mapping of COs with POs and PSOs) |            |     |     |     |     |     |     |     |     |      |      |      |      |      |      |      |      |
|--|------------|-----|-----|-----|-----|-----|-----|-----|-----|------|------|------|------|------|------|------|------|
| PO-PSO<br>CO   | PO1        | PO2 | PO3 | PO4 | PO5 | PO6 | PO7 | PO8 | PO9 | PO10 | PO11 | PO12 | PSO1 | PSO2 | PSO3 | PSO4 | PSO5 |
|  | <b>CO1</b> | 1   | 3   | 2   | 2   | -   | -   | -   | 1   | 2    | 1    | -    | 2    | -    | 2    | 2    | 1    |
| <b>CO2</b>   | 1          | 3   | 1   | 3   | -   | -   | -   | 2   | 3   | -    | -    | 3    | -    | 1    | 1    | 1    | -    |
| <b>CO3</b>   | 1          | 3   | 1   | 2   | -   | -   | -   | 1   | 2   | 2    | -    | 2    | -    | 1    | 1    | 1    | -    |
| <b>CO4</b>   | 1          | 3   | 1   | 2   | -   | -   | -   | 1   | 3   | -    | -    | 3    | -    | 1    | 2    | 1    | -    |
| <b>CO5</b>   | 1          | 3   | 1   | 2   | -   | -   | -   | 1   | 2   | 1    | -    | 2    | -    | 1    | 1    | 1    | -    |

**1- Low Correlation; 2- Moderate Correlation; 3- Substantial Correlation**

**Attributes & SDGs**

| Course Code  | Course Title         | Attributes    |                  |                   |                 |                              |             |                     | SDGs No.   |
|--------------|----------------------|---------------|------------------|-------------------|-----------------|------------------------------|-------------|---------------------|------------|
|              |                      | Employability | Entrepreneurship | Skill Development | Gender Equality | Environment & Sustainability | Human Value | Professional Ethics |            |
| <b>DT208</b> | <b>PATHOLOGY LAB</b> | <i>r</i>      | <i>r</i>         | <i>r</i>          | <i>r</i>        |                              | <i>r</i>    | <i>r</i>            | <b>3,4</b> |



## Integral University, Lucknow

|  |              |                            |                                     |          |          |          |          |
|--|--------------|----------------------------|-------------------------------------|----------|----------|----------|----------|
| <b>Effective from Session: 2024-25</b> |              |                            |                                     |          |          |          |          |
| <b>Course Code</b>                     | <b>DT209</b> | <b>Title of the Course</b> | <b>MEDICAL BIOCHEMISTRY- II LAB</b> | <b>L</b> | <b>T</b> | <b>P</b> | <b>C</b> |
| <b>Year</b>                            | <b>II</b>    | <b>Semester</b>            | <b>III</b>                          | <b>0</b> | <b>0</b> | <b>4</b> | <b>2</b> |
| <b>Pre-Requisite</b>                   | <b>Nil</b>   | <b>Co-requisite</b>        | <b>Nil</b>                          |          |          |          |          |
| <b>Course Objectives</b>               |              |                            |                                     |          |          |          |          |

| Course Outcomes |  |
|-----------------|--|
| <b>CO1</b>      | Students will be able to learn about Picratemethod, Benedict's/ Uristixmethod                          |
| <b>CO2</b>      | Students will be able to learn about Rothera Nitroprussidetest, Serum Amylase, Serum Lipase estimation |
| <b>CO3</b>      | Students will be able to learn about Malloy–Evelyn method, BCG method                                  |
| <b>CO4</b>      | Students will be able to learn about Uricase/ PAP method   |
| <b>CO5</b>      | Students will be able to learn aboutSemi Autoanalyzer, Flame Photometer                                |

| Unit No. | Title of the Unit                 | Content of Unit  | Contact Hrs. | Mapped CO |
|----------|-----------------------------------|--|--------------|-----------|
| 1        | <b>PICRATE METHOD.</b>            | 1. Estimation of Serum Creatinine by Alkaline Picrate method.                        | 60           | CO1       |
| 2        | <b>BENEDICT'S/ URISTIX METHOD</b> | 2. Toperform urine sugar by Benedict's/ Uristix method.                              |              | CO1       |
| 3        | <b>ROTHERA NITROPRUSSIDE TEST</b> | 3. Toperform urine Ketone body analysis by Rothera Nitroprusside test.               |              | CO2       |
| 4        | <b>SERUM AMYLASE</b>              | 4. Estimation of Serum Amylase.  |              | CO2       |
| 5        | <b>SERUM LIPASE</b>               | 5. Estimation of Serum Lipase.   |              | CO3       |
| 6        | <b>MALLOY–EVELYN METHOD</b>       | 6. Estimation of Serum Total Bilirubin by Malloy–Evelyn method.                      |              | CO3       |
| 7        | <b>BCG METHOD</b>                 | 7. Estimation of Serum Albumin by BCG method and calculation of Globulin & A/Gratio. |              | CO4       |
| 8        | <b>URICASE/ PAP METHOD</b>        | 8. Estimation of Serum uric acid by Uricase/ PAP method.                             |              | CO4       |
| 9        | <b>SEMI AUTOANALYZER</b>          | 9. Demonstration of Semi Autoanalyzer.   |              | CO5       |
| 10       | <b>FLAME PHOTOMETER</b>           | 10. Demonstration of Flame Photometer.   |              | CO5       |

| Reference Books: |   |
|------------------|---|
| 1.               | <u>Ranjna Chawla</u> , Practical Clinical Biochemistry: Methods and Interpretations.          |
| 2.               | <u>Praful B. Godkar, Darshan P. Godkar</u> , Textbook of Medical Laboratory Technology.       |
| 3.               | <u>Dr Rammik Sood</u> , Medical Laboratory Technology: Methods and Interpretations.           |
| 4.               | <u>Bishop, Fodyand Schoeff</u> , Clinical Chemistry, techniques, principles and correlations. |
| 5.               | <u>Singh &amp; Sahni</u> , Introductory Practical Bio chemistry.                              |

| e-Learning Source: |   |
|--------------------|---|
| 1.                 | <a href="https://youtu.be/t5DvF5OVr1Y">https://youtu.be/t5DvF5OVr1Y</a> |
| 2.                 | <a href="https://youtu.be/gggC9vctvBQ">https://youtu.be/gggC9vctvBQ</a> |
| 3.                 | <a href="https://youtu.be/ufvZ8bYtyO8">https://youtu.be/ufvZ8bYtyO8</a> |
| 4.                 | <a href="https://youtu.be/Q6R4o-oECxs">https://youtu.be/Q6R4o-oECxs</a> |

| Course Articulation Matrix: (Mapping of COs with POs and PSOs) |            |     |     |     |     |     |     |     |     |      |      |      |      |      |      |      |      |
|--|------------|-----|-----|-----|-----|-----|-----|-----|-----|------|------|------|------|------|------|------|------|
| PO-PSO CO  | PO1        | PO2 | PO3 | PO4 | PO5 | PO6 | PO7 | PO8 | PO9 | PO10 | PO11 | PO12 | PSO1 | PSO2 | PSO3 | PSO4 | PSO5 |
|  | <b>CO1</b> | 1   | 3   | 2   | 2   | -   | -   | -   | 1   | 2    | 1    | -    | 2    | -    | 2    | 2    | 1    |
| <b>CO2</b>   | 1          | 3   | 1   | 3   | -   | -   | -   | 2   | 3   | -    | -    | 3    | -    | 1    | 1    | 1    | -    |
| <b>CO3</b>   | 1          | 3   | 1   | 2   | -   | -   | -   | 1   | 2   | 2    | -    | 2    | -    | 1    | 1    | 1    | -    |
| <b>CO4</b>   | 1          | 3   | 1   | 2   | -   | -   | -   | 1   | 3   | -    | -    | 3    | -    | 1    | 2    | 1    | -    |
| <b>CO5</b>   | 1          | 3   | 1   | 2   | -   | -   | -   | 1   | 2   | 1    | -    | 2    | -    | 1    | 1    | 1    | -    |

**1- Low Correlation; 2- Moderate Correlation; 3- Substantial Correlation**  
Attributes & SDGs

| Course Code  | Course Title                        | Attributes    |                  |                   |                 |                              |             | SDGs No. |                     |
|--------------|-------------------------------------|---------------|------------------|-------------------|-----------------|------------------------------|-------------|----------|---------------------|
|              |                                     | Employability | Entrepreneurship | Skill Development | Gender Equality | Environment & Sustainability | Human Value |          | Professional Ethics |
| <b>DT209</b> | <b>MEDICAL BIOCHEMISTRY- II LAB</b> | <i>r</i>      | <i>r</i>         | <i>r</i>          | <i>r</i>        |                              | <i>r</i>    | <i>r</i> | <b>3,4</b>          |