PG DIPLOMA IN IMMUNOTECHNIQUES
(Non-Semester)
(With effect from the academic year 2013-14)

Eligibility for the Course
Candidates for admission to PG Diploma In Environmental Health & Hygine could posses a Bachelors degree in Zoology, Botany, Chemistry, Biochemistry, Microbiology Biotechnology/Environmental/ Animal/plant Food sciences, Dietetics & Nutrition, Bioinformatics, BE in Chemical Engineering & Biotechnology; B.Tech in Biotechnology & Bioinformatics/Nanotechnology; BDS; MBBS; B.Sc in Agri/Agri Biotechnology;B.V.Sc., B.F.Sc., .Pharm and BPT.

Duration of the Course
One year PG Diploma in Immunotechniques diploma course non-semester for One Year duration

Examination
All the theory paper are of 3hours duration each for maximum of 100 marks with passing minimum of 50 marks Practical examinations are also for 3 hours duration for a maximum of 100 marks and passing minimum of 50 marks.

Question Paper Pattern
Maximum marks: 100 Time: 3 hours

Part A (5 x 3 = 15)
Five short answer questions (One question from each unit)

Part B (5 x 8 = 40)
Paragraph questions (Total questions 8, out of which answers are to be given for any five questions;)

Part C (3x 15 = 45)
Total questions 5, out of which answers are to be given for any Three questions;
<table>
<thead>
<tr>
<th>S.No</th>
<th>Theory &amp; Practicals</th>
<th>Maximum Marks</th>
<th>Minimum Marks</th>
</tr>
</thead>
<tbody>
<tr>
<td>1.</td>
<td>Immunology</td>
<td>100</td>
<td>50</td>
</tr>
<tr>
<td>2.</td>
<td>Immunotechniques</td>
<td>100</td>
<td>50</td>
</tr>
<tr>
<td>3.</td>
<td>Human Genetics</td>
<td>100</td>
<td>50</td>
</tr>
<tr>
<td>4.</td>
<td>Molecular Diagnostics</td>
<td>100</td>
<td>50</td>
</tr>
<tr>
<td>P1</td>
<td>Practical – I: Immunotechniques</td>
<td>100</td>
<td>50</td>
</tr>
<tr>
<td>P2</td>
<td>Practical – II: Molecular Diagnostics</td>
<td>100</td>
<td>50</td>
</tr>
</tbody>
</table>
PAPER 1: IMMUNOLOGY

UNIT – I: LYMPHOID ORGANS, CELLS AND ANTIGENS


UNIT – II: ANTIBODY AND COMPLEMENT


UNIT – III: BIOLOGY OF LYMPHOCYTES, MHC & TCR


UNIT – IV: HYPERSENSITIVITY, AUTOIMMUNITY & TUMOR IMMUNOLOGY

Hypersensitivity: types – Clinical aspects of type I, Type II, III and IV - Autoimmune diseases – Tumor antigens: types, effector mechanisms against tumors and immunodiagnosis- Immunological disorders: Primary & seconday.

UNIT – V: INFECTION & IMMUNITY

Immunity to bacterial, viral, and protozoan pathogens – Cell and humoral immunity – Host strategies of defense – Evasive strategies by pathogens: adaptations such as mutation (escape mutants) and molecular mimicry- PAMPS.

REFERENCE:

PAPER - III: IMMUNOTECHNIQUES

UNIT-I: IMMUNOSEROLOGY


UNIT-II: ELISA, ELISPOT AND RIA

IF – ELISA – RIA - Principles of ELISA – types- direct, indirect and sandwich – clinical diagnostic applications – Cell ELISA - ELISpot assay – cytokine testing- other applications- Detection of HIV &TB by Western blotting

UNIT-III: TOOLS AND TECHNIQUE


UNIT- IV: IMMUNOTECHNOLOGY

MAb - Rab Mab - HAMA - HACA – Abzymes - Plantibodies - Ab fragments.

UNIT-V: VACCINOLOGY


REFERENCE:

PAPER-III: HUMAN GENETICS AND DISORDERS

UNIT-I: HUMAN GENOME OVER VIEW

History and development of human genetics; organization of the human genome- Genes and chromosome- structure, function and inheritance- Repetitive DNA in human genome & its significance - Alu and SINE repeats- organization of centromeres and telomeres- telomers & aging-Microsatellites &VNTRs.

UNIT-II: CELL AND CHROMOSOMAL ANALYSIS

Methods for genetic studies –chromosomal analysis- biochemical analysis- Somatic cell genetics: somatic cell hybrids, radiation hybrids - FISH, fibre FISH, mFISH -Tissue culture techniques: long-term and shorts-term cultures- lymphoblastoid cell lines- T cell & cancer cell culture- applications.

UNIT-III: HUMAN GENOMIC TECHNIQUES

Human genome mapping – genetic mapping, physical mapping-restriction fragment length polymorphism- pulse field gel electrophoresis- yeast artificial chromosomes- bacterial artificial chromosomes- expressed sequence tags- microsatellites and single nucleotide polymorphisms- HUGO & Human Genome Mapping- implications & applications.

UNIT-IV: MOLECULAR METHODS

Identification and isolation of disease genes – positional cloning, functional cloning-DNA and cDNA microarrays- Cancer genomics- pre-natal diagnosis- chorionic villus sampling, amniocentesis - Pre-implantation diagnosis – Principles of Genetic counseling- Ethical aspects of gene testing.

UNIT-V: HUMAN IMMUNODEFICIENCY DISEASES

Asplenia AGamma, CGD, MHC I&II, Hyper IgM, HIV SCID

REFERENCES:

UNIT–I: MICROBIAL & VIRAL DIAGNOSTICS


UNIT II: MOLECULAR DIAGNOSTICS OF DISEASES


UNIT III: CANCER DIAGNOSTICS


UNIT IV: FOETAL DIAGNOSTICS:


UNIT V: CYTOGENETIC DIAGNOSTICS

Karyotyping and chromosomal banding– Molecular diagnosis of syndromes - Klinfelter, Downs’ and Turners’- Molecular cytogenetics: FISH, Fiber FISH and m–FISH-Clinical applications.

REFERENCES:

PAPER-V: PRACTICALS – I IMMUNOTECHNIQUES

1. Bleeding techniques and serum separation.
2. Immunization protocols
3. Dissection of chick & wild rat for lymphoid organs (Demo).
4. Immunodiffusion techniques
5. Immunelectrophoresis techniques.
6. Fraction of T & B sub–populations from peripheral blood.
7. Microlymphocytotoxicity assay (ALS titration assay). (Demo)
8. Immunofluorescence–two color (AO/PI). (Demo)
10. ELISA (HIV, TB)-DEMO.

PAPER - VI: PRACTICALS – II MOLECULAR DIAGNOSTICS

1. Bacterial DNA extraction.
2. Serodiagnosis for microbial & viral pathogens.
3. HIV detection by RT-PCR.
4. PCR diagnosis of Mycobacterium tuberculosis.
5. PCR–RFLP for pathogens.
6. DNA Fingerprinting.
7. Western blotting.
8. mRNA extraction and cDNA synthesis.