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| **B.Sc MICROBIOLOGY (CBCS) SYLLABUS**  **SECOND YEAR –** **SEMESTER**- **III** |
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| **MBT- 301 MICROBIAL GENETICS AND MOLECULAR BIOLOGY** |
| **TOTAL HOURS:48** **CREDITS: 4** |
| **UNIT-I No. of hours: 10** |
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| DNA and RNA as genetic material.  Structure and organization of prokaryotic DNA.  Extrachromosomal genetic elements – Plasmids and transposons.  Replication of DNA – Semi conservative mechanism, Enzymes involved in replication. |
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| **UNIT-II**  **No. of hours: 10** |
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| Mutations – spontaneous and induced, base pair changes, frame shifts, deletions, inversions, tandem duplications, insertions.  Mutagens - Physical and Chemical mutagens.  Outlines of DNA damage and repair mechanisms.  Genetic recombination in bacteria – Conjugation, Transformation and Transduction. |
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| **UNIT-III No. of hours: 10** |
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| Concept of gene – Muton, Recon and Cistron.  Types of RNA and their functions.  Genetic code. Structure of ribosomes. |
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| **UNIT-IV No. of hours: 8** |
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| Types of genes – structural, constitutive, regulatory  Protein synthesis – Transcription and translation.  Regulation of gene expression in bacteria – *lac* operon. |
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| **UNIT-V No. of hours: 10** |
| Basic principles of genetic engineering.  Restriction endonucleases, DNA polymerases and ligases. Vectors.  Outlines of gene cloning methods.  Polymerase chain reaction. Genomic and cDNA libraries.  General account on application of genetic engineering in industry, agriculture and medicine.  Disadvantages of GM crops |

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**MBP- 301 MICROBIAL GENETICS AND MOLECULAR BIOLOGY**

**TOTAL HOURS: 48**  **CREDITS: 2**

1. Study of different types of DNA and RNA using micrographs and model / schematic representations
2. Study of semi-conservative replication of DNA through micrographs / schematic representations
3. Isolation of genomic DNA from *E. coli*
4. Estimation of DNA using  UV spectrophotometer.
5. Resolution and visualization of DNA by Agarose Gel Electrophoresis.
6. Resolution and visualization of proteins by Polyacrylamide Gel Electrophoresis (SDS-PAGE).
7. Problems related to DNA and RNA characteristics, Transcription and Translation.
8. Induction of mutations in bacteria by UV light.
9. Instrumentation in molecular biology – Ultra centrifuge, Transilluminator, PCR

**Learning Out comes:**

1. **Develop knowledge on microbial genetics and molecular biology and instrumentation.**