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| Course Title | MICROBIOLOGY-IV | |
| Course Code | BSM 401 | |
| Course Credit | Lecture | : 4 |
| | Practical | : 3 |
| | Tutorial | : 0 |
| | Total | : 7 |
| Course Objectives | | |
| <p>On the completion of the course, students will be able to:</p> <ul style="list-style-type: none"> ▪ To evaluate the mechanisms of disease causing microbes ▪ To understand various strategies involved in bacteriology, mycology and virology ▪ To compare the significance of data by bio statistical analysis ▪ To analyse experimental data by using computational analytical tools | | |
| Detailed Syllabus | | |
| Sr. No. | Name of Chapter & Details | Hours Allotted |
| | Section-I | |
| Unit-1 | <p>MEDICAL MYCOLOGY AND PARASITOLOGY</p> <p>1.1 General properties of fungi: Classification based on disease, superficial, subcutaneous, deep mycosal opportunistic infections including Mycotoxins, systemic mycoses.</p> <p>1.2 Method of collection of samples</p> <p>1.3 Antifungal agents</p> <p>1.4 Mycetoma, Aspergillosis and Candidiasis.</p> <p>1.5 Filaria, Toxoplasma</p> | 09 |

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| Unit-2 | <p>MICROBIAL DISEASES OF RESPIRATORY SYSTEM</p> <p>1.1 Causative organism, mode of action, transmission, symptoms, prevention and control.</p> <p>Normal flora of respiratory tract</p> <p>Bacterial diseases</p> <ul style="list-style-type: none"> -Scarlet fever -Diphtheria -Streptococcal pharyngitis <p>Fungal disease</p> <ul style="list-style-type: none"> -Histoplasmosis -Coccidioidomycosis -Pneumocystis pneumonia <p>Viral disease</p> <ul style="list-style-type: none"> -Viral pneumonia - Respiratory Syncytial virus (RSV) - Influenza | 09 |
| Unit-3 | <p>MODERN ANALYTICAL TECHNIQUES AND BIOSENSOR TECHNOLOGY</p> <p>3.1 DNA sequencing: Principles and Methods, Automated DNA sequence Analyzer</p> <p>3.2 Blotting techniques and FISH</p> <p>3.3 Electrophoresis</p> <p>3.4 Chemical synthesis of DNA</p> <p>3.5 PCR Technology: Principle, Methods and Applications</p> <p>3.6 Introduction to Chromatography, paper chromatography, Thin layer chromatography</p> | 09 |
| | Section-II | |

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| Unit-4 | <p>COMPUTER SCIENCE AND BIOSTATISTICS</p> <p>4.1 MS Office: MS word, MS power point, MS Excel</p> <p>4.2 Descriptive Statistics Measures of Central Tendency: Mean, Median and Mode, quartiles, deciles and percentiles (both for raw data and grouped data) Measures of Dispersion: Range, Interquartile Range, Variance, Standard Deviation and Coefficient of Variation.</p> <p>4.3 Practical Using MS-Excel</p> <p>4.4 Statistical hypotheses: Null and Alternative hypotheses. Simple and Composite hypotheses. Statistical Tests: Acceptance region and Rejection Region. Types of errors. Significance Tests Distribution: for Normal One sample tests for mean –z test and t-test. Two sample tests for normal distributions: Tests for means (i) when variances are known (ii) - Test for equality of means. Confidence Intervals</p> <p>4.5 ANOVA</p> | 12 |
| Unit-5 | <p>MICROBIAL DISEASE OF REPRODUCTIVE AND URINARY TRACT</p> <p>5.1 Structure and function of urinary system.</p> <p>5.2 Normal flora of urinary and reproductive tract</p> <p>5.3 Bacterial disease -Leptospirosis -Cystitis - Bacterial vaginosis</p> <p>5.4 Protozoan disease - Tricomoniasis</p> <p>5.5 Viral disease - Genital Herpes - AIDS - Genital warts</p> | 12 |
| MICROBIOLOGY (PRACTICAL) 6 HOURS PER WEEK | | |

1. Estimation of Protein by Bradford method
2. Circular paper Chromatography of Amino acids
3. Ascending paper chromatography of sugars
4. Thin Layer Chromatography of Amino acids
5. Agarose Gel Electrophoresis of DNA
6. SDS PAGE of Protein
7. Evaluation of antifungal agent by bioassay method
8. Isolation and identification of candida from clinical specimen
9. To check significance of data derived from an experiment by using ANOVA
10. Basic use of Computer – Use of Excel and power point.

Instructional Method and Pedagogy:

- Lectures will be conducted with the aid of multi-media projector, black board, OHP etc.
- Assignments based on course content will be given to the students at the end of each unit/topic and will be evaluated at regular interval.
- Surprise tests/Quizzes/Tutorials will be conducted.
- The course includes a laboratory, where students have an opportunity to build an appreciation for the concepts being taught in lectures.
- Minimum ten experiments shall be there in the laboratory related to course contents.

Students Learning Outcomes:

At the end of the course the students will be able to:

- Know the concepts of microbiology and microbial biotechnology.
- Apply knowledge in various strategies involved in microbial biotechnology industries.
- Understand the concept of microbial production of antibiotic, organic acid, vitamins, amino acid and industrial alcohol.

Reference Books:

1. *Microbiology An Introduction*. By [Gerard J. Tortora]
2. Wilson and Walker, *Practical Biochemistry – Principle and Technique*
3. Shrivastava , *Bioanalytical Techniques* , Narsa Publication
4. Attwood & Parry. D.J., *Introduction to Bioinformatics*
5. Westhead, Parish and Twyman, *Instant notes in Bioinformatics*
6. Andreas. D., & Baxevanis, *Bioinformatics*