BIOLOGY 301: Advanced Molecular Biology and Biotechnology

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Office Hours: MW 2-4 PM

Course Description:
This comprehensive course covers advanced methods and tools in modern molecular biology and biotechnology. Students will learn cutting-edge techniques in genetic engineering, protein expression, and bioinformatics analysis.

Learning Objectives:
- Understand advanced molecular biology techniques
- Master protein purification and characterization methods
- Apply bioinformatics tools for sequence analysis
- Design and execute independent research projects
- Analyze and interpret experimental data
- Present scientific findings effectively
- Understand ethical considerations in biotechnology

Weekly Schedule:
Week 1: Introduction to Advanced Molecular Biology
Week 2: DNA Cloning and Recombinant Technology
Week 3: Protein Expression Systems
Week 4: Protein Purification Techniques
Week 5: Enzyme Kinetics and Characterization
Week 6: Bioinformatics and Sequence Analysis
Week 7: CRISPR and Gene Editing
Week 8: Midterm Examination
Week 9: Cell Culture and Transfection
Week 10: Immunological Techniques
Week 11: Mass Spectrometry Applications
Week 12: Structural Biology Methods
Week 13: Student Research Presentations
Week 14: Biotechnology Applications
Week 15: Ethics in Biotechnology
Week 16: Final Examination