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| **Course Outline** |

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| **Department & Number** | BioSc 187 | **Number of Weeks** | 18 |
| **Course Title** |  DNA Manipulation and Cloning | **Lecture Hours** | 15 |
| **Prerequisite** | Biosc 159 or 172L or 148 (may be taken concurrently) | **Lab Hours** | 9 |
| **Challenge Policy**  | Successful completion of a college level course in Microbiology or Cell and Molecular Biology | **\*Hours By Arrangement** |  |
| **Co-requisite** |  | **Units**  | 1 |
| **Challenge Policy**  |  |  |  |
| **Advisory** |  |

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| **COURSE/CATALOG DESCRIPTION** |

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| This course is designed to teach students how to construct and analyze recombinant plasmids for use in biotechnology and research. Students will learn to use the molecular tools of cloning and analysis of recombinant DNAs.  |

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| **COURSE OBJECTIVES** |
| At the completion of the course the student will be able to: |

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| Demonstrate facility will laboratory calculations |
| Demonstrate correct usage of precision measuring devices (micropipetors, analytical balance, etc.) |
| Demonstrate an understanding of molecular cloning (*in vitro*) of DNA by creating a recombinant DNA molecule. Students will then demonstrate their understanding of cellular cloning (*in vivo*) by transforming *E. coli* cells with their molecular clones and using antibiotic selection to isolate cellular clones. |
| Demonstrate their ability to isolate, purify, and analyze DNA from molecular clones by restriction endonuclease mapping and agarose gel electrophoresis. Identify the genetic function and genomic location of the DNA molecule that has been cloned. |

 **COURSE CONTENT:** (In detail; attach additional information as needed and include percentage breakdown)

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| Structure of DNA, enzymes used to manipulate isolated DNA, including restriction endonucleases, alkaline phosphatases, DNA ligase. |
| Mathematic calculations required to construct enzymatic reactions and analysis of transformation efficiency. |
| Manipulation of vector and insert DNA fragments to make molecular clones, transformation of E. coli cells and antibiotic selection to identify cellular clones, isolation and analysis of purified plasmid DNA, clone mapping using restriction endonuclease digestion and agarose gel electrophoresis |

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| **METHODS OF INSTRUCTION** |

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| Lecture |
| Laboratory Experimentation |
| Instruction on and supervised practice with instrumentations |
| Working with a partner and in small groups |

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| **INSTRUCTIONAL MATERIALS** |

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| **Textbook Title:** | DNA Manipulation and Cloning Course Materials: BioSc 187 |
|  **Author:** | Katherine Krolikowski, PhD |
|  **Publisher:** | Note: this is not a textbook, but an instructional materials packet written by the instructor |
|  **Edition/Date:** | Spring 2011 |

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| **COURSE EXPECTATIONS** (Use applicable expectations) |

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|  **Outside of Class Weekly Assignments** | **Hours per week** |

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| Weekly Reading Assignments | 1 |
| Weekly Writing Assignments |  |
| Weekly Math Problems | 0.5 |
| Lab or Software Application Assignments | 0.5 |
| Other Performance Assignments |  |

 **STUDENT EVALUATION**: **(Show percentage breakdown for evaluation instruments)**

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| 50 | **%** | Completion of all laboratory experiments and exercises |
| 30 | **%** | Laboratory Notebook kept according to Good Laboratory Practices |
| 20 | **%** | Final report on genetic function of cloned DNA fragment. |

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|  **GRADING POLICY (Choose LG, CR/NC, or SC)** |

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| X | **Letter Grade** |  | **Pass / No Pass** |  | **Student Choice** |
| 90% - 100% = A  | 70% and above = Pass | 90% - 100% = A |
| 80% - 89% = B  | Below 70% = No Pass  | 80% - 89% = B |
| 70% - 79% = C  |  | 70% - 79% = C |
| 60% - 69% = D  |  | 60% - 69% = D |
| Below 60% = F  |  | Below 60% = F |
| *or* |
| 70% and above = Pass |
| Below 70% = No Pass |

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| **Prepared by:** | Katherine Krolikowski, PhD |

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| **Content Review Date:**  | October 2013 |

Revised 04/13