

OUTCOMES BASED LEARNING MATRIX

Course: BIOL 136 Human Genetics

Department: Biology

Course Description

This course deals with biological aspects of human reproduction and genetics. It will include such topics as cellular division, anatomy and physiology of the human reproductive systems, prenatal development, reproductive technologies, human sexuality, transmission genetics, DNA and chromosomes and genetic technology. This course is designed for the non-science major. Prerequisites: Preparing for College Reading II (ENGL092), Introductory Writing (ENGL099), and Fundamentals of Mathematics (MATH010), or waiver by placement testing results, or Departmental Approval

The individual outcomes listed in the first column answer the question: **What must the learner know and be able to do at the end of the course?** Items in the third column should answer the question: **How do we know?** The second column is where teachers can be most creative; it's for pedagogy. Each rectangle in column one contains just one outcome; the corresponding rectangles in columns two and three, however, may contain more than one item.

The code indicates the core competencies being strengthened by the outcomes activities and the assessment tools.
Critical Thinking (CT); technology skills (TS); oral communications (OC); quantitative skills (QS); reading (R); writing (W).

| COURSE OUTCOMES | OUTCOMES ACTIVITIES | ASSESSMENT TOOLS |
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| <p>Anatomy and Physiology of the Human Reproductive System Describe the anatomy of the male and female reproductive systems Explain the physiology of gametogenesis</p> | <ul style="list-style-type: none"> • Read text (CT,R) • Attend lecture/discussion (W,OC,CT) • Watch video <i>Human Reproductive System</i> (W,OC,CT) • Construct diagrams (R,W,CT) • Complete case study (R,W,CT,QS) | <ul style="list-style-type: none"> • Quiz (CT,W,R) • Test (CT,W,R) • Grade diagrams (CT,W,R,QS) • Case study essay (CT,W,R,QS) |

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| <p>Prenatal Development Describe the series of events from fertilization through birth. Know the key features of development in each trimester. Be familiar with teratogens and their effects.</p> | <ul style="list-style-type: none"> • Read text (CT,R) • Attend lecture/discussion (W,OC,CT) • Watch video <i>The Miracle of Life</i> (CT,W,OC) • Complete web activities (R,W,CT,QS) • Complete case study (R,W,CT,QS) | <ul style="list-style-type: none"> • Quiz (CT,W,R) • Test (CT,W,R) • Grade web activities (CT,W,R,QS) • Case study essay (CT,W,R,QS) |
| <p>Sex determination and sexuality Explain sex determination in humans. Describe physiology of sex development. Be familiar with example disagreements between chromosomal and physical sex. Discuss possible genetic influences on sexual orientation in order to evaluate issues related to sex and sexuality</p> | <ul style="list-style-type: none"> • Read text (CT,R) • Attend lecture/discussion (W,OC,CT) • Review current articles (CT, W, R) • Discussion (R,W,CT, OS) • Complete case study (R,W,CT,QS) | <ul style="list-style-type: none"> • Quiz (CT,W,R) • Test (CT,W,R) • Article summaries (CT,W,R,QS) • Case study essay (CT,W,R,QS) |
| <p>DNA and Chromosomes Describe the basic structure of the DNA molecule in order to understand the molecular basis of inheritance and the use of DNA in engineering, biotechnology and forensics.. Describe what a mutation is and the various causes of mutation. Describe the basic structure of a chromosome Describe the normal human karyotype, abnormalities in chromosome number and chromosome structural aberrations.</p> | <ul style="list-style-type: none"> • Read text (CT,R) • Attend lecture/discussion (W,OC,CT) • Construct a DNA model (R,W,CT,QS) • Review current articles (CT, W, R) • Discussion (R,W,CT, OS) • Complete web activities (R,W,CT,QS) • Complete case study (R,W,CT,QS) | <ul style="list-style-type: none"> • Quiz (CT,W,R) • Test (CT,W,R) • Grade models (CT,W,R,QS) • Article summaries (CT,W,R,QS) • Grade web activities (CT,W,R,QS) • Case study essay (CT,W,R,QS) |

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| <p>Cell Division Describe the cell cycle and mitosis. Describe meiosis. Compare and contrast mitosis and meiosis. Describe spermatogenesis and oogenesis. Compare and contrast spermatogenesis and oogenesis. (These all contribute to understanding of normal growth and reproduction in humans.)</p> | <ul style="list-style-type: none"> • Read text (CT,R) • Attend lecture/discussion (W,OC,CT) • Diagram the cell cycle and stages of mitosis (R,W,CT,QS) • Use beads to demonstrate mitosis and meiosis (R,W,CT,QS) • Diagram spermatogenesis and oogenesis (R,W,CT,QS) • Review current articles (CT,W,R) • Discussion (R,W,CT,OS) • Web activities (R,W,CT,QS) • Complete case study (R,W,CT,QS) | <ul style="list-style-type: none"> • Quiz (CT,W,R) • Test (CT,W,R) • Grade diagrams (CT,W,R,QS) • Article summaries (CT,W,R,QS) • Grade web activities (CT,W,R,QS) • Case study essay (CT,W,RQS) |
| <p>Transmission Genetics Describe basic Mendelian genetics in humans and know example traits. Describe polygenic and multifactorial inheritance and give example traits in humans.</p> | <ul style="list-style-type: none"> • Read text (CT,R) • Attend lecture/discussion (W,OC,CT) • Genetic problems(R,W,CT, QS) • Class activity determining phenotype and genotype for common single gene physical traits (R, W, CT, QS, OS) • Review current articles (CT, W, R) • Discussion (R,W,CT, OS) • Complete web activities (R,W,CT,QS) • Complete case study (R,W,CT,QS) | <ul style="list-style-type: none"> • Quiz (CT,W,R) • Test (CT,W,R) • Grade genetic problems(CT,W,R,QS) • Article summaries (CT,W,R,QS) • Grade web activities (CT,W,R,QS) • Case study essay (CT,W,RQS) |

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| <p>Pedigree Analysis Describe the use of pedigrees in the study of human genetics. Compare and contrast patterns of inheritance.</p> | <ul style="list-style-type: none"> • Read text (CT,R) • Attend lecture/discussion (W,OC,CT) • Construct pedigrees (R, W. CT, QS) • Solve pedigree problems (R, W. CT, QS, OS) • Complete web activities (R,W,CT,QS) • Complete case study (R,W,CT,QS) | <ul style="list-style-type: none"> • Quiz (CT,W,R) • Test (CT,W,R) • Grade pedigrees (CT,W,R,QS) • Grade web activities (CT,W,R,QS) • Case study essay (CT,W,RQS) |
| <p>Reproductive Technologies Explain various causes of infertility. Describe reproductive technologies available. Explain pros and cons, misconceptions, and controversies surrounding the various reproductive technologies in order to make informed decisions about issues related to infertility.</p> | <ul style="list-style-type: none"> • Read text (CT,R) • Attend lecture/discussion (W,OC,CT) • Review current articles (R,W,CT) • Discussion (R,W,CT,OS) • Draw and label steps of procedures (R,W,CT,QS,OS) • Complete web activities (R,W,CT,QS) • Complete case study (R,W,CT,QS) | <ul style="list-style-type: none"> • Quiz (CT,W,R) • Test (CT,W,R) • Article summaries (CT,W,R,QS) • Grade drawings (R,W,CT,QS) • Grade web activities (CT,W,R,QS) • Case study essay (CT,W,RQS) |
| <p>Genetic Technologies</p> | <ul style="list-style-type: none"> • Read text (CT,R) | <ul style="list-style-type: none"> • Quiz (CT,W,R) |

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| <p>Describe and explain the various genetic technologies. Explain pros and cons, misconceptions, and controversies surrounding the various genetic technologies</p> | <ul style="list-style-type: none"> • Attend lecture/discussion (W,OC,CT) • Review current articles (R,W,CT) • Discussion (R,W,CT, OS) • Draw and label steps of procedures (R,W,CT,QS,OS) • DNA fingerprinting simulation (R,W, CT, QS) • Complete web activities (R,W,CT, QS,) • Complete case study (R,W,CT,QS) | <ul style="list-style-type: none"> • Test (CT,W,R) • Article summaries (CT,W,R,QS) • Grade drawings (R,W,CT,QS) • Grade web activities (CT,W,R,QS) • Case study essay (CT,W,R,QS) |
| <p>Special Topics of Interest Course may include one or more of the following topics: Genetics and forensics Genetics in current criminal trials Genetics of behavior Genetics of the immune system</p> | <ul style="list-style-type: none"> • Read text (CT,R) • Attend lecture/discussion (W,OC,CT) • Review current articles (R, W. CT) • Discussion (R,W,CT, OS) • Draw and label steps of procedures (R, W. CT, QS, OS) • Watch and summarize videos, television programs (R,W, CT, QS) • Complete web activities (R,W,CT,QS) • Complete case study (R,W,CT,QS) | <ul style="list-style-type: none"> • Quiz (CT,W,R) • Test (CT,W,R) • Article summaries (CT,W,R,QS) • Grade drawings (R,W,CT,QS) • Grade video/TV summaries (R,W,CT,QS) • Grade web activities (CT,W,R,QS, TS) • Case study essay (CT,W,RQS) |
| <p>Strengthen Core Competencies in order to increase success in this and other courses and in the workplace.</p> | <p>Referenced above</p> | <p>Referenced above</p> |