

DEREE COLLEGE SYLLABUS FOR: BI 3204 HUMAN GENETICS**UK LEVEL: 5
UK CREDITS: 15
US CREDITS: 3/0/3**

(Updated Fall 2019)

PREREQUISITES:BI 1000 Introduction to Biology I
BI 1101 Introduction to Biology II**CATALOG DESCRIPTION:**

An integrated exploration of human genetics for science majors. Focuses on fundamental concepts of gene transmission, gene expression, human development, population genetics and human origins, including the genetics of immunity, cancer and behaviour. It examines genetic diseases and applications of genetic technologies.

RATIONALE:

Human Genetics- Concepts and Applications as an overview of a dynamic subject that will continue to expand rapidly for many years. It is a subject that is becoming increasingly important in clinical practice, and a subject that will certainly have more and more complex effects on the general public as it makes decisions about reproduction health and career issues. Concept questions prompt recall of basic facts, while cases, research questions, and bioethics questions challenge the student to apply key concepts to very real situations. The point is that genetics affects us all but even more, students studying biomedical sciences, environmental studies or psychology will find the course highly interesting and useful.

LEARNING OUTCOMES:

As a result of taking the course students should be able to:

1. Evaluate the basic processes of gene transmission, mutation, expression, and regulation.
2. Formulate genetic hypothesis, work out their consequences, and test the results against observed data.
3. Develop skills in problem solving.
4. Analyze cases as models for studying inherited disease, immunity and cancer and human development.
5. Evaluate the major techniques involved in genetic engineering, gene and protein therapy and various reproductive technologies.

METHOD OF TEACHING AND LEARNING:

In congruence with the learning and teaching strategy of the college, the following tools are used:

- Class lectures, interactive learning (class discussions, group work) video presentations, and practical problems solved in class.
- Exercises and primary source documents are assigned as homework, the solutions of which are reviewed in class
- Laboratory work (some laboratory reports and drawings may be required).
- CD-ROMS (Genetics-From Genes to Genomes, The Unity and Diversity of Life, The Dynamic Human, Explorations in Cell Biology & Genetics, Explorations in Human Biology.)
- Office hours: students are encouraged to make full use of the office hours of their instructor, where they can ask questions, see their exam paper, and/or go over lecture/lab material.
- Use of a blackboard site, where instructors post lecture notes, assignment instructions, timely announcements, as well as additional resources.

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ASSESSMENT:	<p>Summative:</p> <table border="1" data-bbox="431 201 1370 548"> <tr> <td data-bbox="431 201 1101 317">Midterm examination In-class midterm examination (2-hour) (Multiple choice/short answers/matching /essay questions combination/problem solving)</td> <td data-bbox="1101 201 1370 317" style="text-align: center;">40%</td> </tr> <tr> <td data-bbox="431 317 1101 548">Portfolio Flipped Classroom: Chapter presentation 20% Paper or Poster 20% Oral Presentation of Paper or Poster 20%</td> <td data-bbox="1101 317 1370 548" style="text-align: center;">60%</td> </tr> </table> <p>Formative:</p> <table border="1" data-bbox="431 604 1370 695"> <tr> <td data-bbox="431 604 1101 636">Multiple "diagnostic on-line" tests</td> <td data-bbox="1101 604 1370 636" style="text-align: center;">0</td> </tr> <tr> <td data-bbox="431 636 1101 695">Multiple choice/short answers/ essay questions</td> <td data-bbox="1101 636 1370 695" style="text-align: center;">0</td> </tr> </table> <p>The formative MC (on-line) and written essays aim to prepare students for the examination. Students are expected to submit feedback on their performance. The midterm examination tests Learning Outcomes 1-3 The final examination tests Learning Outcomes 4 & 5</p>	Midterm examination In-class midterm examination (2-hour) (Multiple choice/short answers/matching /essay questions combination/problem solving)	40%	Portfolio Flipped Classroom: Chapter presentation 20% Paper or Poster 20% Oral Presentation of Paper or Poster 20%	60%	Multiple "diagnostic on-line" tests	0	Multiple choice/short answers/ essay questions	0
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Multiple "diagnostic on-line" tests	0								
Multiple choice/short answers/ essay questions	0								
INDICATIVE READING:	<p>REQUIRED READING: Required Textbook: Textbook: Ricki Lewis, Human Genetics, WCBI / McGraw- Hill, USA. Latest edition.</p> <p>RECOMMENDED READING: N/A</p>								
INDICATIVE MATERIAL: (e.g. audiovisual, digital material, etc.)	<p>REQUIRED MATERIAL: N/A</p> <p>RECOMMENDED MATERIAL: N/A</p>								
COMMUNICATION REQUIREMENTS:	N/A								
SOFTWARE REQUIREMENTS:	Microsoft Word, Microsoft PowerPoint, Blackboard CMS								
WWW RESOURCES:	<p>www.mhhe.com/lewisgenetics http://www.mhhe.com/lewisgenetics7 http://www.dnalc.org/ www.sciam.com www.mhhe.com/maderinquiry14 http://www.cellsalive.com/ http://www.dnafb.org/dnafb/ http://www.usd.edu/biol/labs/151/devel51.htm http://www.learner.org/courses/biology/archive/animations.html https://genographic.nationalgeographic.com/genographic/lan/en/atlas.html http://www.mcb.harvard.edu/BioLinks.html http://www.ornl.gov/sci/techresources/Human_Genome/project/about.shtml http://www.nature.com/index.html</p>								

**INDICATIVE
CONTENT (LEC):**

1. PART I: Introduction
 - 1.1 Overview of Human Genetics
 - 1.2 Cells
 - 1.3 Meiosis and Development
2. PART II: Transmission Genetics
 - 2.1 Single-Gene Inheritance
 - 2.2 Beyond Mendel's Laws
 - 2.3 Matters of Sex
 - 2.4 Multifactorial Traits
 - 2.5 Genetics of Behavior
3. PART III: DNA and Chromosomes
 - 3.1 DNA Structure and Replication
 - 3.2 Gene Action: From DNA to Protein
 - 3.3 Control of Gene Expression and Genome Architecture
 - 3.4 Gene Mutation
 - 3.5 Chromosomes
4. PART IV: Population Genetics
 - 4.1 Constant Allele Frequencies
 - 4.2 Changing Allele Frequencies
 - 4.3 Human Ancestry and Eugenics
5. PART V: Immunity and Cancer
 - 5.1 Genetics of Immunity
 - 5.2 Genetics of Cancer
6. PART VI: Genetic Technology
 - 6.1 Genetic Technologies: Amplifying, Modifying, and Monitoring DNA
 - 6.2 Genetic Testing and Treatment
 - 6.3 Reproductive Technologies
 - 6.4 Genomics