DEREE COLLEGE SYLLABUS FOR: BI 3204 HUMAN GENETICS

3/0/3

UK LEVEL: 5
UK CREDITS: 15

(Updated**:** Spring 2025**)**

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, genomics and applications of genetic technologies.
RATIONALE:	To inform students about human genetic concepts and applications, as an overview of a dynamic subject that is continuously expanding. It is a field that is becoming increasingly important in clinical practice and will certainly have complex effects on the general public, as it contributes to decisions about reproduction and health. Concept questions prompt recall of basic facts, while cases, research questions, and bioethics questions challenge the student to apply key concepts to real situations. The course highlights current aspects in mendelian genetics and genomics, as well as topics of human molecular genetics.
LEARNING OUTCOMES:	*As a result of taking this course, the student should be able to:* 1. Evaluate the basic processes of gene transmission and mutation. 2. Formulate genetic hypotheses and develop skills in problem solving. 3. Evaluate the organisation and complexity of the human genome. 4. Demonstrate knowledge in human molecular genetics, link genetics to disease and understand genetic techniques to treat diseases.
METHOD OF TEACHING AND LEARNING:	In congruence with the teaching and learning 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. • 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.
ASSESSMENT:	Summative:

1st assessment In-class midterm examination (1-hour) (Multiple choice/short answers/matching /essay questions combination/problem solving)	**30%**

	2nd assessment Oral Presentation/Flipped classroom — **20%** **Final assessment** Final exam – 2h (Multiple choice/short answers/matching /essay questions combination/problem solving) — **50%** **Formative:** Multiple "diagnostic on-line" tests Multiple choice/short answers/ — 0 Essay questions — 0 The formative assessments aim to prepare students for the examinations. Students are expected to submit feedback on their performance. The midterm examination tests Learning Outcomes 1-2. The second assessment tests Learning Outcome 4. The final examination tests all learning outcomes and is comprehensive. *The final grade for this module will be determined by averaging all summative assessment grades, based on the predetermined weights for each assessment. If students pass the comprehensive assessment that tests all Learning Outcomes for this module and the average grade for the module is 40 or higher, students are not required to resit any failed assessments.*
INDICATIVE READING:	**REQUIRED READING:** 1. D. Peter Snustad, Michael J. Simmons, Principles of Genetics, Wiley, latest edition. **RECOMMENDED READING:** **1. Ricki Lewis, Human Genetics, latest edition, McGraw Hill.** 2. Strachan and Read, Human Molecular Genetics, 5th edition, Garland Science. 3. Other sources, including journal and newspapers' articles, research papers etc. recommended by the instructor throughout the semester.
INDICATIVE MATERIAL: *(e.g. audiovisual, digital material, etc.)*	**REQUIRED MATERIAL:** N/A **RECOMMENDED MATERIAL:** N/A
COMMUNICATION REQUIREMENTS:	Verbal and written skills using academic / professional English.
SOFTWARE REQUIREMENTS:	MS Office and Blackboard CMS
WWW RESOURCES:	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.dnaftb.org/dnaftb/) 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
INDICATIVE CONTENT:	1. Introduction -Overview of Human Genetics -Cells -Meiosis and Development 2. Transmission Genetics -Single-Gene Inheritance -Beyond Mendel's Laws -Matters of Sex -Multifactorial Traits -Genetics of Behavior 3. DNA and Chromosomes - DNA Structure and Replication - Gene Action: From DNA to Protein - Gene Mutation - Chromosomes 4. Population Genetics -Constant Allele Frequencies -Changing Allele Frequencies -Human Ancestry and Eugenics 5. Immunity and Cancer -Genetics of Immunity -Genetics of Cancer 6. Human Genetic disease - Chromosomal abnormalities and structural variants - Molecular pathology: connecting genotypes to phenotypes 7. - Genetic variation and the human genome - Organization of the human genome - Genomics - Origins of DNA sequence variation 8. Applied human molecular genetics - Genetic testing in healthcare - Genetic approaches to treating disease