

General Education Course Proposal

Proposed Course: ^{Nscu} ~~GEL~~ 121 Blood Units 03
Prefix No. Title

Department: Biology School: Natural Sciences

GE Category (Indicate one category only):

Foundation: A1___; A2___; A3___; B4___
 Breadth: B1___; B2___; C1___; C2___; D___; E___
 Integration: B X; C___; D___; International/Multicultural___

Existing Course___; Revised Course___; New Course X

Course Included in Current GE Program___

New courses require the Undergraduate Course Proposal form in addition to this form.
 Revised courses require the Undergraduate Course Change Request in addition to this form.

Proposed catalog description: Limit course description to 40 words using succinct phrases. Include prerequisites, limitations, lecture/lab hours. Indicate former course number, e.g., (Former Biol 105)

Blood (3)
 Prerequisites: Completion of Physical Sciences (B1) and Life Sciences (B2) General Education course requirements; Courses in Biology and Chemistry (High School or College) strongly recommended. Introduction to Blood, its chemical, physical biological aspects, as well as its connections to human affairs, both currently and historically. In addition, the unique properties, composition, and disorders of blood and blood circulation will be studied for applications to medicine and forensics.

Enrollment limit per section: 50
 Expected number of sections per semester – Year 1 1; Year 3 2

Attachments:

1. A statement presenting the ways in which this course meets the Specifications provided in the appropriate section of the General Education Policy as well as in the Policies for Inclusion and Evaluation of General Education Courses.
2. A statement of elements common to all sections of this course, identifying content, objectives, required student activities, grading policy, representative texts, and an approximate schedule for the course. Required student activities include such things as papers, research projects, homework, laboratory and/or studio performance, recitations, participation, attendance, and exams.
3. A typical syllabus for a particular offering of the course.
4. Any special cost factors associated with this course.

Approval for Inclusion in General Education

<p><u>Thomas E. Malby</u> 5/15/98 <small>Department Chair Date</small></p>	<p><u>Stammers</u> 9/22/98 <small>School Curriculum Committee Date</small></p>
<p><u>Stanley M. Ziff</u> 9/22/98 <small>School Dean Date</small></p>	<p><u>Peter Arnold</u> 12/15/98 <small>General Education Subcommittee Date</small></p>
<p><u>Frank A. Kehoe</u> 12/22/98 <small>Associate Provost Date</small></p>	

limitations, and discussion opportunities which form a core of the course's curriculum (Attachment #2, Assessments).

6. Be taught at least once every two years

Enrollment figures will dictate frequency of course offerings. Our department has offered Capstone courses with as many as three sections per semester when enrollments required it.

Attachment #2

Common Elements to All Course Sections

The goal of this lecture/seminar course is to develop some in-depth understanding of an essential biological component using a breadth of approaches from the liberal arts and sciences, but with an emphasis on the natural science perspective. Fundamental concepts on the composition, structure, physiology and genetics of blood will provide the scientific basis for an analysis of societal questions related to blood and blood-borne diseases, e.g. blood transfusions, leukemia and AIDS, and forensic analyses. In addition, the symbolism invoked by blood, with its artistic and social consequences, will provide an additional societal theme to link studies of blood to the broader liberal arts and sciences.

The psychological associations of blood have been extensively exploited for artistic impact. The course will begin with some favorite cinematic examples for illustration of blood's unique impact as a viscous, red fluid that is symbolic of life itself. Literary examples and paintings or drawings will also be used to discuss the broader impact of blood in societies. The chemical composition of blood, creating these unique properties, and the physics of blood flow, through "pipes and pumps", will be used to connect the physical sciences to the discussion. In addition to introductions of circulatory problems associated with blood pressure and flow, these topics will set the stage for crime scene reconstruction using the chemical and physical properties of blood.

The process of blood clotting will describe the biological mechanisms which insure the integrity of the fluid dynamics, and the genetics of blood clotting will illustrate not only fundamental molecular biology of gene control over biological function, but will also illustrate the importance of biological processes to historical events--hemophilia and the Russian Revolution. The fundamental role of blood in respiration will be addressed with the biochemistry of hemoglobin, including more molecular biology connections with the genetics of Sickle Cell Anemia. Other blood diseases, including cancers and AIDS, will be studied and will allow a brief discussion of health care issues related to research resources and delivery mechanisms for diseases with limited or "stigmatized" patient populations. Blood Transfusions, as a mirror of some of these societal concerns, will be studied from its genetic and physiological aspects. The use of blood cell genetics for forensic purposes will also be addressed.

The social practices related to blood and human sacrifice will complete the course study. Certain historical case studies, including uses of blood as a political tool--"The Blood Libel Legend" and "Bloodsucking Witchcraft", will be evaluated for understanding the "message" that blood conveys.

Curriculum Outline:

Weeks

- 1 I. Blood's Psychological Intrigue
 - A. Bloody Images: Artistic, Cinematic and Literary References
 - B. Bloody Thieves: Leeches, Mosquitoes and Vampire Bats
- 1 1/2 II. Blood Composition and Roles
 - A. Cell Types and their Functions
 - B. Plasma Chemistry
 - 1. Osmoregulation
 - C. Forensic Identities from Blood Chemistry
- 2 III. Blood Circulation and Forensic Applications of Blood Flow
 - A. Fluid Dynamics
 - B. Blood Pressure
 - 1. Hypertension, Hypotension, Heart Attack, Stroke, and Kidney Failure
 - C. Lymph System
 - D. Crime Scene Reconstruction
- 2 1/2 IV. Blood Clotting
 - A. Platelets and the Process
 - B. Hemophilia
 - 1. Genetics--Queen Victoria
 - 2. Historical Consequences---Rasputin
 - C. Embolism--Too much of a good thing
- 1 V. Hemoglobin, RBCs and Respiration
 - A. Iron, erythropoiesis and anemia
 - 1. Blood cells in the Andes
 - 2. Sickle Cell Anemia
 - B. Acid /Base Balance in the Blood
- 1 VI. Blood Cell Diseases and Therapies
 - A. Cancers--Leukemias and Lymphomas
 - B. AIDS
 - C. Gene Therapy
- 2 1/2 VII. Blood Transfusion
 - A. The transfusion process
 - B. ABO Blood Typing and HLA Tissue Typing
 - 1. Other Blood Typing systems
 - C. Rh factor and Erythroblastosis fetalis
 - D. AIDS and Hepatitis B
 - 1. Blood as a Biohazard
- 1 VIII. The Jury is Out--Forensics Analysis of Blood for Human Identification
 - A. Protein and enzyme analysis of blood
 - B. DNA Profiling of blood samples
- 1 IX. Rituals, Religion and Vampires: Blood and Human Affairs
 - A. Sacrifice
 - B. Cannibalism
 - C. Witches and Vampires

ASSESSMENTS:

Examinations

A selection of an artistic, cinematic, or literary image related to blood that invokes a strong psychological response and a written critique of analyzing the association.

Internet Search(es) for compiling a bibliography of Web sites related to a specific topic related to blood. The search(es) must be distinct from the topic area selected for a term paper. For each, compare and contrast the information from five sites relevant to the issue addressed. Critique the veracity of the sources and identify bias, if any, in the presentation of material at these five sites--Who do you trust and why?

Research Term Paper (about 10-15 pages) on a blood-related topic approved by the instructor. An instructor-defined minimum number of scholarly bibliographic citations will be required to insure a "C" grade on the assignment.

Classroom participation of discussion is expected.

GRADING:

Defined achievement levels for specific grades will be identified by the instructor. In general there will be a balance of credit given for examinations, classroom participation and written project assignments. All assignments must be turned in to pass the class. Deadlines for the assignments will be announced by the instructor and late assignments will have their value reduced by 10% per school day. University Policies on Plagiarism or Cheating will be enforced.

REPRESENTATIVE TEXTS:

Blood: Bearer of Life and Death edited by Maya Pines, Howard Hughes Medical Institute, Chevy Chase, MD, 1993, 60 pages.

Asimov, Isaac (1959). *The Living River* [QP 91, A79, 1959]

EXAMPLES OF SUPPLEMENTAL MATERIALS: (Selections from the following)

Schele, Linda (1986). *The Blood of Kings, Dynasty and Ritual in Maya Art*
[f F1435.3, .A7, S34, 1986]

The Bible (Numerous references)

Fantastic Voyage by Isaac Asimov

Blood Brothers (Play)

Psycho (Video)

Blood Simple (Video)

Schindler's List (Video)

Pulp Fiction (Video)

Grimes, Larry (1995). "Shall these bones live? The problem of bodies in Alfred Hitchcock's *Psycho* and Joel Coen's *Blood Simple*". In: *Screening the Sacred: Religion, Myth, and Ideology in Popular American Film* edited by Joel W. Martin and Conrad E. Ostwalt Jr. [PN 1995.5, S36, 1995]

Vogel, Steven (1992). *Vital Circuits: On Pumps, Pipes and the Workings of Circulatory Systems* [QP 102, V65, 1992]

Bevel, Tom and Ross M. Gardner (1997). *Bloodstain Pattern Analysis: with and Introduction to Crime Scene Reconstruction* [RA 1061, B48, 1997]

Eckert, William G. And Stuart H. James (1989). *Interpretation of Bloodstain Evidence at Crime Scenes* [RA 1061, E26, 1989]

Tannahill, Reay (1975). *Flesh and Blood: A History of the Cannibal Complex* [GN 409, T36, 1975]

Jay, Nancy (1992). *Throughout Your Generations Forever: Sacrifice, Religion and Paternity* [GN 473.5, J38, 1992]

Strack, Hermann L. (1909). *The Jew and Human Sacrifice: Human Blood and Jewish Ritual* [BM 715, S8]

Dundes, Alan, editor (1991). *The Blood Libel Legend: A Casebook in Anti-Semitic Folklore* [BM 585.2, B58, 1991]

Nutini, Hugo G. And John M. Roberts (1993). *Bloodsucking Witchcraft* [F1221, N3, N87, 1993]

Selected readings of other appropriate articles, such as (1) "News and Views" sections of *Science* and *Nature*, (2) popular press articles, (3) relevant articles from *Scientific American* or *Discover*.

Attachment #3: Typical Syllabus

GEI 1??
Fall 2000
TTh 11:10-12:25

Dr. Kovacs, Science 334
Office Hrs: MW 14:10-16:00
TTh 9:30-11:00

Blood

Text: *Blood*, edited by Maya Pines, 1992; *The Living River* by Isaac Asimov, 1959

Additional Materials: On Reserve in the Library

The goal of this course is to study a biological substance, i.e BLOOD, in depth, applying approaches from several Natural Sciences disciplines to better understand its composition and role. The impact that Blood plays in human affairs and the social consequences of that influence will also be addressed in order to demonstrate the transcendence that one compound can have across a broad spectrum of the disciplines constituting liberal education.

<u>Week</u>	<u>Topics</u>	<u>Assignments</u>
1	Blood's Artistic and Emotional Intrigue	Selected Readings
2	Blood Composition and Roles Plasma Chemistry "Bloody Image" Assignment	Pines--Introduction Asimov--Chap. 1-4 50 pts
3	Physics of Blood Flow and Pressure Hypertension, Heart Attack, and Stroke	Selected Readings Pines--Heart Attack
4	Forensics: Bloodstains in Crime Reconstruction	Selected Readings
5	Blood Clotting and Embolisms Exam #1	Pines--Blood Clotting Asimov--Chap. 8,9 100 pts
6	Hemophilia--Queen Victoria and Rasputin	Pines--Hemophilia
7	Hemoglobin, Red Blood Cells Respiration and Acid/Base Balance Newspaper/Magazine Critique	Pines--Hemoglobin Asimov--Chap 5-7 50 pts
8	Sickle Cell Anemia; RBC Blood Typing; Blood Transfusions Term Paper Topic Decision	Selected Readings

9	Human White Blood Cell Typing; DNA Profiling from Blood Exam # 2	Selected Readings Selected Readings 100 pts
10	Forensic Analysis of Blood; O.J. Simpson and Beyond	Selected Readings
11	Blood Cell Disease--Leukemia Internet Search Due	Pines--Blood Cancer 100 pts
12	AIDS/ Blood Safety	Pines--Blood-borne Killer
13	Sacrifice, Religion and Vampires Term Paper Due	Selected Readings 200 pts
14	Ancient/Historic Blood Practices	Selected Readings
15	Blood Substitutes, etc. in Modern Human Affairs	Selected Readings
	Classroom Discussion	200 pts
	FINAL EXAM	200 pts

Assignments: (All typewritten; late assignments will lose 10% value per school day)

“Bloody Image”: Select a visual or verbal image where blood is depicted or described. Discuss and evaluate the role that blood plays in enhancing the imagery in comparison to some other possible substitute. (About 2 pages of discussion and evaluation; about one page for image)

Newspaper/Magazine Critique: Select an article describing blood or blood-borne materials in human affairs. Critique the report for scientific and social veracity; support your points with at least two other references. (About 2 pages)

Internet Search: Compile a bibliography of Web Sites related to a specific blood-related topic. Compare and Contrast the information from five sites relevant to the issue. Critique the veracity of the sources and identify bias, i.e. who do you trust and why? (About 5 pages)

Research Term Paper: Select a topic by the 7th week of the semester for approval of the instructor. Overall paper about 10 pages with a minimum of 8 bibliographic citations in order to obtain a “C” grade or better.

Classroom Participation:

Students should come to class prepared to discuss the material. When a specific question is addressed to the student, an evaluation of the preparedness and thoroughness will be made on a 10 point scale. The average of these evaluations will determine the percentage of the classroom participation points earned by the student, i.e. $\% \times 200 =$ total participation points. Attendance in class is expected; unexcused absences will contribute a 0 to the average for class participation.

Exams:

In-class exams covering aspects of the lecture material will be a mixture of objective, short answer and essay questions; short answer and essay will predominate. The final exam will be comprehensive. **No make-up exams**; for excused exams, the next exam value will double in percentage as a substitute for the missed points. If the final exam is missed for an excusable reason, the student will receive an Incomplete Grade and will generally be expected to take the Final Exam during the subsequent offering of the course.

Grading:

The percentage of total points earned will determine the final grade based on the following general scheme:

88-100%	= A
78-87%	= B
65-77%	= C
55-64%	= D
<50%	= F

University Policies on Plagiarism and Cheating will be enforced. Consult Catalog for details. Students with Disabilities should consult the Schedule of Classes for details about available services in compliance with the ADA.

Attachment #4

Cost Factors:

The usual staffing and supply considerations for a General Education lecture/seminar course should apply. This course could be adapted for an interactive distance learning format which requires additional hardware and technical assistance.

Blood

Congruency with Area B Objectives for an Upper Division, Integrated Course

<u>GE Specification</u>	<u>Content Topics</u>	<u>Sample Readings</u>	<u>%Time</u>
Imparting Knowledge of Facts and Principles of Living and Non-living Systems	1] Blood Composition/Roles	<i>Blood</i> , text <i>Living River</i> , text	11.1%
	2] Blood Circulation/Physics; Blood Pressure	<i>Vital Circuits</i>	11.1%
	3] Blood Clotting, Hemophilia	<i>Blood</i> , text	8.8%
	4] Hemoglobin, RBCs, and Respiration	<i>Blood</i> , text <i>The Living River</i> , text	8.8%
Promote Understanding and Appreciation of the Methodologies of Science	1] Blood Transfusion and Typing; AIDS; Rh factor	<i>Blood</i> , text <i>The Living River</i> , text	15.5%
	2] Forensic Analysis	<i>Bloodstain Pattern Analysis; Bloodstain Evidence</i>	8.8%
	3] Blood Cell Diseases and Therapies	<i>Blood</i> , text	8.8%
Attention to the Influence of Science on World's Civilizations	1] Artistic/Psychological Imagery and Symbolism	Videos-- <i>Psycho</i> , <i>Pulp Fiction</i> , <i>Schindler's List</i> , <i>Blood Simple</i> ; <i>Screening the Sacred</i> ; <i>Blood...in Maya Art</i> <i>Blood Brothers</i> ; <i>The Bible</i>	13.3%
	2] Rituals, Religion, and Politics	<i>Flesh and Blood</i> ; <i>Sacrifice, Religion, Paternity</i> ; "Victoria and Rasputin"-- <i>Blood Jew and Human Sacrifice</i> ; <i>The Blood Libel Legend</i> ; <i>Bloodsucking Witchcraft</i>	13.3%