

UNDERGRADUATE COURSEWORK

FRESHMAN YEAR:

FYP 101 - Identity and Self-Fashioning In Mythic Thought: Part of the *First Year Program* at Holy Cross, this course contained a variety of classical readings in translation including excerpts from Homer, Apollonius, Ovid, and others.

Greek 101 - Introduction to Greek 1: A first course in Greek language involving a systematic investigation of Attic or Homeric Greek through a logical and intensive study of grammar, syntax, and vocabulary.

Latin 343 – Horace: The Odes: Selected poems from the four books of Odes are read in the original. Emphasis is placed on literary analysis and interpretation. In addition, students read a sampling of Horace's other poetic works in the original.

Psychology 100 - Introduction To Psychology: An introduction to the principles of psychology as emerging from the areas of physiological, sensation and perception, developmental, learning, cognition and memory, social, personality, and abnormal.

Classics 160 - Introduction to Classical Archaeology: An introduction to the discipline of archaeology through a survey of important remains from the Greco-Roman world. The course pays special attention to how archaeology relates to other approaches to the study of the Classical world (history, art history, Classical studies).

FYP 102 - Intimations of Immortality: Part of the First Year Program at Holy Cross, this course contained a variety of classical readings in translation including excerpts from Homer, Apollonius, Ovid, and others.

Greek 102 - Introduction to Greek 2: A first course in Greek language involving a systematic investigation of Attic or Homeric Greek through a logical and intensive study of grammar, syntax, and vocabulary.

Religious Studies 122 - Jesus & His Contemporaries: A historical and theological study of Second Temple Judaism (520 B.C.E. To 70 C.E.) paying attention to the variety, richness and complexity of the Judaism of this period. Major Jewish groups are treated: Sadducees, Pharisees, Essenes, Priests, Scribes and Christians. Focus also is on apocalypse as a literary genre and apocalypticism as a worldview and social phenomenon. Attention is paid to the interrelatedness of belief, community structure, ethics, economics and politics. Special emphasis is placed on the ways in which Jesus has been seen to fit into this context.

SOPHOMORE YEAR

Computer Science 161 - Techniques of Programming: An intensive introduction to object-oriented programming in a high-level language for students considering further course work in computing or students majoring in mathematics, the sciences, economics or any other field in which computer programming plays a role. It is expected that most of the class will continue with Data Structures. There is a required weekly lab meeting of this course.

Greek 213 - Intermediate Greek 1: Readings and textual study of Greek prose and poetry.

Mathematics 241 - Multivariable Calculus: A study of the calculus of functions of several variables. The course concerns the theory and applications of differentiation and integration of functions of several variables, vector fields, line integrals, Green's theorem.

Mathematics 243 - Algebraic Structures: An introduction to the primary structures in abstract algebra groups, rings and fields-and the corresponding concept of homomorphism for each of these structures. Emphasis will be placed on using the language of sets, relations, equivalence relations and functions, and developing techniques of proof, including elementary logic and mathematical induction.

Classics 142- History of Rome 1: Republic: A survey of Roman civilization from the Regal period to the late Republic, with a special focus on the political and social forces that led to the establishment of the Principate. The course will concentrate on the primary sources for this period, including the historians, inscriptions, and monuments.

Computer Science 262 - Data Structures: This course introduces standard data structures such as stacks, lists, trees, and graphs. Algorithms and techniques for sorting, searching, graph traversal, hashing, and recursion are discussed. Analysis of algorithms and special topics are covered as time allows. There is a required weekly lab meeting of this course.

Mathematics 242 - Principles of Analysis: An in-depth study of the theory of the calculus of functions of one variable. Topics include sequences, series, continuity, differentiability, the extreme value theorem, the mean value theorem, Riemann integration, and the fundamental theorem of calculus.

Mathematics 244 - Linear Algebra: Designed to acquaint students with the basic techniques of linear algebra. Topics include matrices, vector spaces, subspaces, linear transformations, bilinear forms, determinants, eigenvalue theory, and the finite dimensional spectral theorem. Applications and additional topics are included as time permits.

JUNIOR YEAR

Computer Science 381 - Introduction to Computer Systems & Organization: This course covers fundamental topics related to the design and operation of a modern computing system. Relationships are drawn between circuits and system software. Topics include hardware and software organization, virtual machines, physical fundamentals of transistors, digital logic design, memory system organization, architecture and management, CPU design, multiprocessors, data representation, machine language, microprogramming, assembly language, assemblers and linkers, CISC versus RISC, interrupts and asynchronous event handling, networking, and the past and present of computer system design, architecture, and organization.

Greek 332 – Homer: A reading of selected books of the Iliad and/or Odyssey with special attention to their literary value as well as to problems of oral composition, metrics, linguistics, authorship and text history.

Mathematics 361 - Real & Abstract Analysis 1: Topological ideas are introduced through a treatment of metric space topology. After the study of open, closed, compact, and connected spaces with emphasis on their behavior under continuous mappings, selected topics from functional analysis are considered. These include \limsup and \liminf , relation of uniform convergence to differentiation and integration, and the Stone Weierstrass approximation theorem.

Philosophy 209 - Theory of Knowledge: Do you know that you are not a brain in a vat being force-fed experiences by an evil scientist? In this course we will consider Descartes' skeptical arguments that we can't really know whether the world is the way it appears to us. These skeptical arguments will lead us to consider what knowledge is, whether "knowledge" means the same thing in the philosophy classroom as it means outside it, and what justifies our beliefs. Writings of contemporary analytic philosophers will be read and discussed.

Classics 265 – The Archaeology of Egypt: This course investigates ancient Egypt with a view to providing a basic background to that culture's architectural and artistic monuments as well as to objects that teach us about daily life in ancient Egypt. Specific themes and topics will include the history and monuments of ancient Egypt; burial and notions of the afterlife; religion and the gods; the principles of Egyptian art; daily life, and changing notions of kingship and authority over time. The course will cover the Predynastic period through the early development of Christianity. Special attention will be paid to interactions between Egypt and the rest of the Mediterranean world, including Greece and Rome.

Computer Science 384 - Topics in Computer Science – Compiler Construction: The theories, tools, and techniques for translator creation are the focus of the course. Topics include: regular expressions, grammars, finite state machines, lexical analysis, parsing, linguistic approaches to problem solving, intermediate code trees, register allocation, code generation, a variety of optimization schemes and techniques as well as Unix support for translation such as lex and yacc. An essential and distinguishing feature of the course is the project requirement. Students are required to build a working compiler which is a large software engineering project of significant complexity. This course carries the project course designation.

Greek 360 – Aeschylus: A detailed study of the Agamemnon and other dramas of Aeschylus in the original.

Mathematics 362 - Real & Abstract Analysis 2: The second semester topics include an introduction to Lebesgue-Stieltjes integration, Hilbert space and other material from linear space theory.

SENIOR YEAR

Computer Science 384 - Topics in Computer Science – Algorithms: This course provides an introduction to the design and analysis of fundamental algorithms and their complexity. We will present several algorithm design strategies that build on the data structures and programming techniques introduced in Data Structures. The general techniques covered will include: Divide-and-conquer algorithms, dynamic programming, greediness and probabilistic algorithms. The topics will include: sorting, searching, graph algorithms, O -notation, and introduction to the classes P and NP, and NP-completeness.

Economics 111 - Principles of Macroeconomics: Develops principles which explain the operation of the economy and suggest alternative policy solutions to contemporary economic problems. Principles of Macroeconomics develops the principles of national income analysis, money, economic growth, and international trade.

Classics 401 - Tutorial - Theodosius of Bithynia: Designed for selected students with approval of a professor and the Department Chair. This tutorial investigated the relationship between text and diagram in the *Spherics* of Theodosius, a Greek mathematician from the first century B.C.

Mathematics 351 - Abstract Algebra 1: An in-depth study of the structure of groups, rings, and fields. Depending on the instructor, applications to Galois theory, number theory, geometry, topology, physics, etc., are presented.

Classics 402 - Tutorial – Theodosius of Bithynia: Designed for selected students with approval of a professor and the Department Chair. This tutorial investigated the relationship between text and diagram in the *Spherics* of Theodosius, a Greek mathematician from the first century B.C.

Computer Science 382 - Programming Languages: Principles for designing and implementing programming languages are presented as well as styles and features that encourage and discourage the writing of good software. Specific topics include language syntax and semantics, comparison of language features and their implementation, methods of processing a program, establishing the run-time environment of the program and the major programming language paradigms (the imperative/procedural, functional/applicative, declarative/logic, and object-oriented paradigms).

Mathematics 391 - Seminar – Game Theory: Provides an opportunity for individual and group investigation of topics not covered in ordinary course work.

Religious Studies 311 - Seminar – Zen Buddhism: Examination of Zen Buddhism and its influences on East Asian civilizations. Surveys the texts and monastic practices that define Zen spiritual cultivation and the history of the Soto and Rinzai schools' evolution. Special attention is also devoted to the distinctive poetic (haiku), fine arts (painting, gardening, tea ceremony), and martial arts (swordsmanship) disciplines that this tradition has inspired in China and Japan.

GRADUATE COURSEWORK

FALL 2005

Computer Science 150-BIO – Special Topics: Computational Biology: This course introduces the key computational challenges in molecular biology and explores the algorithms and programming paradigms behind their solutions. Topics include sequence alignment and comparison, genomic annotation, microarray data analysis, and proteomics. Underlying computational techniques such as dynamic programming, hidden Markov models, statistical analyses, and search and optimization procedures will be highlighted.

Arabic 001 - Introduction to Arabic: Introduction to Modern Standard Arabic. Pronunciation, script, basic grammar, and reading skills. No previous knowledge of Arabic language or script required.

SPRING 2006

Computer Science 150-ICS - Computer Security: This course will introduce the student to a systems perspective on host-based and network-based computer security. The course will introduce the student to current vulnerabilities and measures for protecting hosts and networks. A large multi-part programming project will provide the student with a comprehensive introduction to firewalls and intrusion detection systems.

Computer Science 170 - Computation Theory: Models of computation: Turing machines, pushdown automata, and finite automata. Grammars and formal languages including context-free languages and regular sets. Important problems including the halting problem and language equivalence theorems.

SUMMER 2006

Computer Science 150-A - Extreme Programming: Agile Methods and Open Source: This course will cover the XP version of Agile Programming, covering all major aspects (Test First Programming, Use Case Analysis, Automated Regression Testing, Revision Control, Integrated Programmer Documentation, Refactoring, Pair Programming, etc.). We will be developing a significant web application using components and tools such as Eclipse, Tomcat, JDBC, Struts, JUnit, Java Server Pages, Ant, Subversion, JavaDoc, CruiseControl, Tapestry, Spring, Bugzilla, DreamWeaver, and Ajax (think Google Maps). We will do readings on the free software movement (aka Open Source), looking at GNU, Linux, Apache, the Java Community Process, etc. We will also consider the history of software development and the impact of Patents, Licensing, and landmark legal decisions. This is primarily a programming course. Students will divide into teams to work on different portions of our target application (a web-based sales site). We will be implementing a browser interface for retail customers, a business rules engine, a backend database access component, a browser interface for the CRM (Customer Relations Management) people, and a web services interface for large scale commercial customers.

There will be programming assignments required every class meeting and we will be doing regular code reviews, talking about style and good programming techniques.

FALL 2006

Computer Science 163-01 - Computational Geometry: Design and analysis of algorithms for geometric problems. Topics include proof of lower bounds, convex hulls, searching and point location, plane sweep and arrangements of lines, Voronoi diagrams, intersection problems, decomposition and partitioning, farthest-pairs, rectilinear computational geometry.

Computer Science 175-01 - Computer Graphics: This course explores the fundamentals of computer graphics, including representing digital images, 2D rasterization and anti-aliasing, 3D rendering via ray casting, ray tracing and radiosity, viewing transformations, 3D shape representation, and an introduction to modeling and computer animation. Assignments and projects require a good working knowledge of the C programming language.

SPRING 2007

Computer Science 263-01 - Advanced Computational Geometry: Design and analysis of sequential, parallel, probabilistic, and approximation algorithms for geometry problems. Geometric data structures, complexity, searching, computation, and applications. Selected advanced topics.

Computer Science 275-01 - Advanced Computer Graphics: The course is project based. Students will apply concepts from the classroom and research papers to individual and group projects. In the spring of 2007, the course will focus on implicit modeling. Students will design and implement a 3D graphical modeling system for creating and rendering 3D computer models.