

# **An On-Line Graduate Degree in Computers and Society**

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## **Abstract**

Leaders in today's world need an understanding of the ways that computers and computing are affecting society. To this end, a graduate degree in computers and society is proposed. This degree does not require any background in computer science or mathematics.

## **Keywords**

Computers and Society, New Degree Initiatives, Computer Science Education.

## **Introduction**

It cannot be denied that computers are having an enormous and growing effect on all parts of society. But most people that are not in the field, and some that are, are simply not aware of the multiple aspects of this phenomena, both for good and for ill. To this end, this author designed a graduate degree in computers and society.

## **Background**

This degree is designed to be delivered on-line, but of course, it could be taught via other delivery methods. The degree content could also be adapted for an undergraduate major or minor. The degree description documents are not copyrighted. Therefore, this degree description and/or course descriptions can be freely used as they exist, or with any desired additions, deletions, or alterations.

## **General description**

The unique aspect of this degree is that it does not require any background in either mathematics or programming, so any undergraduate degree is sufficient preparation. Many schools have a single course in computers and society that is open to students of any major, so study of these topics could and should be for anyone. The first course is designed for those without computer related background in order to give the student some understanding of terminology and some key concepts, such as algorithms.

The brief course description below does not include programming; however, with today's tools such as Alice, Greenfoot, and Scratch, this course could include a brief of introduction to programming in a very enjoyable and painless way.

This degree would be considered an "enrichment" degree, that is, not a direct path to a particular career field, such as a traditional computer science degree would be. However,

this study would be very valuable for anyone in government, education, business, medicine, the military, or nearly any field. Policy makers and managers of any type should be aware of the issues covered in these courses in order to operate successfully in modern society.

Many computer ethics textbooks and periodicals cover topics in computers and society (Baase 2008, Kizza 2007, Rosenberg 2004, Spinello 2006) but their coverage is by necessity fairly brief. However, all of these topics, and others, have a wealth of material that can be studied in depth. This degree proposal has an associated web site (Derk 2009) with a bibliography containing 140 print resources, 70 web sites, and 11 movies and films.

A search of the internet did not reveal any graduate degree of this type offered in the U.S., though it did yield numerous institutes, courses, and web sites. (Center of Safe and Responsible Internet Use, Centre for Computing and Social Responsibility, Computer Professionals for Social Responsibility, Electronic Frontier Foundation, Research Center on Computing and Society) This seems to be an opportune situation for a forward-looking school to pioneer in this field.

### **Degree requirements**

It is suggested that this degree would require a minimum of 30 credit hours, consisting of 8 three-hour courses plus a 6 hour thesis. Students with a computer related background would not take course #1. Students with other backgrounds would take 8 of the 9 courses of their choice, except that course #1 would be required.

Residency requirements could be met by requiring an on-campus oral thesis defense.

### **Course descriptions**

Here, in brief, are the nine proposed courses. Due to space constraints, a more detailed description of the degree and the courses, plus a bibliography can be found on the web site. (Derk 2009)

#### **Means and Method of Computer Science**

Primarily for students with no CS or IT background. An introduction to basic ideas, terms, and methods of computer science and information technology. An overview of the fields within computer science. The training and education of the CS professional, professional organizations, professional environment, the “software crisis”, team programming, research methods and familiarity with major CS periodicals.

#### **History of Computing and Data Processing**

A survey of the developments in hardware and software starting with Herman Hollerith, IBM’s punched card accounting machines, the ENIAC, the rise of the mainframe, high level languages, the minicomputer, the database. Personal computers, and the rise of Apple, Microsoft, and the Internet. Increasing use of embedded computers

#### **Computer Ethics, Legal Issues and Crime**

Review of philosophical ethics. Motivation for studying computer related ethics. Study of various computer professional codes of ethics. Intellectual property, copyrights, open

source, and patents. Legal issues and crime. Malware, including viruses and spyware. Hacker “ethic” and computer crime.

### **Computers and Privacy**

Concept of privacy, and why it is valuable to human psychology and relationships. Legal basis of privacy. Privacy and computerized data – why the problem is growing. Medical data, GPS, credit cards, data sharing between corporations, and other issues.

### **Computers in Commerce, Industry, and the Workplace**

Multiple stages of changes in business and industry. Common business practices that have changed with the introduction of computerized data. Manufactured need. Data mining. Credit card security, RFID. Effects of computerization on employment and unemployment. Access to computing by the disabled. Embedded systems. Repetitive strain injuries. Reliability and dependability of software. Security of computer systems.

### **Computers in Science, Government, and Warfare**

Applications in science and engineering. Accuracy of scientific applications, and its dependence on the accuracy of the underlying model. Computerized voting, advantages and disadvantages. The U.S. Census and computerization. E-government. The Patriot Act and other legislation, the war on terrorism, and how computerization affects these things. Record matching between government agencies. War and computers, including computer guided missiles, computer generated virtual reality training, and other military uses of computers

### **Computers in Education and Society**

The algorithmization of the social sciences. Medical use of computers, including computerized body parts. Computers in education, positive and negative. The digital divide. Computers, cell phones, and the developing world. Graphics, virtual reality, computerized special effects in movies, photo manipulation.

### **The Impact of the Internet**

A review of the history of the internet and the world wide web. The internet’s contribution to identity theft and loss of privacy. Effect on free speech, political change, and other social issues. Pornography and pedophiles. Spam, blackholing, email privacy and the legal status of email. The international and intercultural nature of the net, legal issues associated with this, and possible social effect.

### **Humans and Computers, and Computers as Humans**

Computability and non-computability. Artificial intelligence – what it can and cannot do. Artificial life and genetic programming. Robotics. Human responses to computers and robots. Technological mysticism. The future of computer science.

## Conclusion

Presented here and on my web site are the outlines and resources for a master's degree in Computers and Society, accessible to a student with any undergraduate degree. This degree should afford the student valuable insights into the effects of computers and computing on the modern world. It is hoped that this degree will be implemented in some form by colleges and universities.

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