Studies in Cyberspace
LBAR 389C/ENGR 389C - 3 semester hours
Brian C. Etheridge, History
Christian Duncan, Computer Science
Galen Turner, Mathematics
Jeremy Mhire, Political Science
Bill Willoughby, Architecture
Kelly Crittenden, Engineering
Heath Tims, Engineering
John Martin, English

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General description:

Cyberspace extends far beyond the obvious computer and Internet applications to encompass such devices as cell phones, radios, and music/video players. When imagining cyberspace, we normally think of its efficacy in our daily lives; but we must also consider the complex system of telephone lines, satellites, cellular towers, transcontinental fiber optic cables, GPS, and emerging telecom technologies that connect our local citizenry to a broader global infrastructure. Do human rights apply to the virtual places of cyberspace? How do we defend, protect, legislate and secure the virtual realm of information access, telecommunications, and commerce for the freedom of use?

Required Texts and Materials

For purchase:
William Gibson, *Neuromancer* (1984) Ace Books. ISBN: 0441007465 (Available from Amazon.com: here)
BOE-bot (Crittenden and Tims)

On reserve or on the web:
Wendell Berry, "Why I Am Not Going to Buy a Computer," *Technology and the Future* (Belmont, CA: Wadworth/Thomson Learning, 2003). (Mhire)

Tom DeFalco, *Machine Man 2020* (comic-book miniseries)--on reserve at PML

Leon Kass, "Introduction: The Problem of Technology," *Technology in the Western Political Tradition* [ed. Melzer, Weinberger, Zinman] (Ithaca: Cornell University Press, 1993) (Mhire)

Marshall McLuhan, "Decline of the Visual" *Looking Closer 3: Classic Writings on Graphic Design* (New York: Allworth Press, 1999) 174-176 (Willoughby)

William J. Mitchell, "Prologue: Urban Requiem" *e-topia* (Cambridge: MIT Press, 1999) 3-7 (Willoughby)

Jean-Jacques Rousseau, *The First Discourse on the Arts and Sciences* [tr. Gourevitch] (Cambridge: Cambridge University Press, 1997) (Mhire)

Alexis de Tocqueville, selections from *Democracy in America* [ed. Lawrence] (New York: HarperPerennial, 1969) (Mhire)

Films (to be screened on the dates listed below):

Sneakers (1992)
The Matrix (1999)

Syllabus:

12/4: General Introduction

12/9: **Robotics**: BOE-Bot session 1 (Tims and Crittenden)
Introduction to Boe-Bot programming, servo control, dead reckoning (around the pencil exercise), sub-routines.
Boe-Bot Assignment: Figure 8 / Maze dead reckoning navigation due 1/6.

12/11: **Ethics and Philosophy**: Liberal Democracy and the Problem of Technology (Mhire)

12/15: **Film Screening: *Sneakers* (1992), 6 p.m., GTM 105**

12/16: **Cryptography I** (Duncan and Turner)
Sharing information without revealing information;
History of Cryptography, Cryptanalysis, and Steganography;
Symmetric-key cryptosystems.

12/18: **Culture**: Film Discussion: *Sneakers* (Martin)
Cyber-technology and government, cyber-crime, "hacking" and politics

1/6: **Architecture:** Creating your Cyber-fort: Digital Crafting of your team's Base of Operations with Google SketchUp (Willoughby)

1/8: **Robotics**: BOE-Bot session 2 (Tims and Crittenden)
Input: Whiskers, Photoresistor, IR
Boe-Bot Assignment: Figure 8 / Maze autonomous navigation due 1/20.

1/13: **Cryptography II** (Duncan and Turner)
What makes a problem computationally difficult?
Asymmetric (public)-key cryptosystems and hybrid cryptosystems

1/15: **Architecture**: "Introducing Digital Terrains: The Global Use of the Electromagnetic Spectrum in the 21st Century" (**Willoughby)**
Politics: Communication Technology and Propaganda, Past and Present (Etheridge)

1/20: **Culture**: Novel Discussion: William Gibson, *Neuromancer* (Martin)

1/22: **Robotics**: BOE-Bot session 3 (Tims and Crittenden) Additional Servo Control, Attachments
Boe-Bot Assignment: Design additional attachments for 2/5.

1/26 **Film Screening: *The Matrix* (1999)**

1/27: **Cryptography III** (Duncan and Turner)
Diffie-Helman-Merkle and RSA Encryption Explained

1/29: **Culture:** Film Discussion: *The Matrix* (Martin)

2/1: **Discussion board response posting due by 10 p.m.**

2/3: **Philosophy:** Jean-Jacques Rousseau, *The First Discourse on the Arts and Sciences*; Wendell Berry, "Why I Am Not Going to Buy a Computer," (Mhire)

2/5: **Robotics:** BOE-Bot IV (Tims and Crittenden)

2/10: **Cryptography IV** (Duncan and Turner)
Digitally Signing Messages
Cryptographic Hash Functions (SHA-1, MD5)
RSA signatures
Vulnerabilities: Birthday Attacks, Rainbow Tables

2/12: **Politics:** Communication Infrastructure and State Threats, Past and Present (Etheridge and guest lecturer, Dr. Kenneth Rea)

2/17: **Cryptography V** (Duncan and Turner)
Man-in-the-middle attacks
PKI - Public Key Infrastructure, Certificates, Certificate Authorities

2/19: **Politics**: Communication Infrastructure and Non-state threats (guest lecturers, Dr. David Anderson and Dr. Nazir Atassi)

2/26: **Culture** Discussion: *Machine Man*, Facebook, *Second Life*, video games (Martin)

3/3: **Robotics: <u>BOE-bot competition</u>**

Grading policies:

Assessment of student performance will be based on writing assignments, BOE-bot activities, and architectural designs.

Grade breakdown:
20% -- Robotics (Crittenden and Tims)
    4 exercises
20% -- Cryptography (Duncan and Turner)
    5 exercises
20% -- Culture (Martin)
    4 writing assignments
15% -- Politics (Etheridge)
    3 short writing assignments
15% -- Philosophy and Ethics (Mhire)
    2 short writing assignments
10% -- Architectural design of fortification (Willoughby)

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