Work in Progress - A New Course on Intellectual Property, Innovation, and Ethics

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Abstract - **This paper describes a new course at Lafayette College that introduces students to Intellectual Property (IP) concepts, explores the impact of current IP laws and policy on technological innovations, and examines the ethical aspects of IP in engineering design and practice. Students consider both the details of IP (patents, copyright, trademark, and trade secret) and the interactions between new technology, IP owners, society, and law. Coverage of moral theories and ethics early in the course provides a basis for evaluating arguments about these interactions.**

Index Terms – Intellectual Property, Ethics, Engineering Education.

INTRODUCTION

Intellectual Property (IP) has a major impact on engineering design and practice. Designers of new products and technologies must understand the different types of IP so that they can both protect their creations and avoid infringing on the creations of others. However, a broader impact often occurs when a new product or technology is used in ways that were not anticipated by its original designers but which impact IP owners and society at large. When this occurs, IP law and policy do not remain static, but change in response to the new conditions – which further impacts engineering design and practice.

There are two reasons why engineering students should be exposed to IP. First, basic knowledge of IP is valuable to working engineers in either an industrial or entrepreneurial setting. Most existing courses on IP for engineering students (e.g., [1-3]) focus on providing students with this knowledge.

Second, students need a perspective on the broader impacts a new technology and the way that it interacts with existing (and sometimes changing) IP law and policy.

ABET Criterion 3, outcome (c) requires that students demonstrate "an ability to design a system, component, or process to meet desired needs within realistic constraints such as economic, environmental, social, political, ethical, health and safety, manufacturability, and sustainability". Outcome (h) requires that students demonstrate "the broad education necessary to understand the impact of engineering solutions in a global, economic, environmental, and societal context" [3].

Many social, political, and ethical constraints in engineering design are directly related to IP, and IP-related issues have a significant impact on a global economic and societal context. Therefore it is valuable for engineering students to consider the broader impacts of IP as well as the basic knowledge.

This paper describes a new course that addresses both the basics of IP and the broader impacts. This course is derived from an existing "Engineering Professionalism and Ethics" course at Lafayette College [4] that includes coverage of moral theories and ethics. This provides a framework for discussing the broader impacts of IP. It is offered as a Lafayette Values in Science and Technology (VAST) seminar course [5] and usually taken during the sophomore year.

The remainder of this paper is organized as follows. Section 2 describes the objectives of the course, while Section 3 describes the topics covered. Section 4 concludes the paper by describing early results from its first offering in Spring 2009.

2. COURSE OBJECTIVES

This course has five major objectives:

1. To introduce students to the four major types of IP: copyrights, patents, trademarks, and trade secrets.
2. To provide students with a perspective on the impact of recent technological advances on IP law and policy, and, conversely, the impact of recent changes in IP law and policy on technological advance.
3. To introduce students to contemporary issues relating to the interaction between technology and IP law and policy.
4. To introduce students to common types of moral reasoning and to give them opportunities to apply these reasoning tools to societal and technological problems related to IP law and policy, especially from an engineering perspective.
5. To further develop students' writing skills.

Objective 1 focuses on introducing students to the four major types of IP [5], including *copyright*, which protects the expression of an idea, *patents*, which protect inventions, *trademarks*, which protect identifying names and brands, and *trade secrets*, which protect confidential information that provide companies with a competitive advantage.

Objective 2 focuses on issues that occur due to the interaction between technological advance and IP law and policy, while Objective 3 focuses on these issues in current events.

TABLE I
COURSE TOPICS

Place of Text
1. Introduction to Intellectual Property (IP)
2. Recent developments in technology
3. Ethics and Professionalism
Moral Theories
Cultural Relativism
Submectivism
Religion
Ethical Egoism
Utilitarianism
Kant – Categorical Imperative and Respect for Persons
Virtue Theory
Professional Codes of Ethics
4. Copyright
Working with Copyrights
Copyrights and International Law
Fair Use
Copyright Term Extension
The Digital Millennium Copyright Act
Case Study: Digital Music – piracy, DRM, and enforcement
Case Study: Open Source Software
Case Study: Content "Remix" and the Creative Commons
5. Patents
Working with Patents
Patents and International Law
Proposed changes to patent law: The Patent Reform Act of 2007
Case Study: Patent Litigation in Computer Systems
Case Study: Patents and AIDS Drugs
6. Trademarks
Working with Trademarks
Case Study: Cybersquatting
7. Trade Secrets
Working with Trade Secrets and Employer Agreements
Case Study: Trade secret theft at iRobot

Objective 4 focuses on providing students with an ethical framework with which to evaluate the interaction between technology and IP law and policy.

Objective 5 focuses on improving student writing skills, which fit with the "process writing" guidelines of Lafayette's VaST seminars.

3. COURSE TOPICS

Table I lists the topics covered in the new course. It begins with a survey of the major types of IP to give students an understanding of what is protected by each type. This is followed by a brief history of technological developments and their impact on IP. Next, the course introduces students to ethical theories [8] and professional codes of ethics. This is followed by four sections in which students learn more details about each IP type.

A key part of these last four sections is the use of case studies that explore the interaction between current law and policy (or in some cases, proposed changes), technological innovation, and society. Students use the moral theories to analyze each case study and discuss possible outcomes.

For copyright, several case studies consider the impact of the ongoing "war on piracy" waged by the representatives of copyright owners in the face of changing digital technology [9], which has led to both technical innovations and changes to law.

For patents, case studies consider the balance between the interests of inventors and those who use the inventions. For example, concerns about excessive litigation have led to a patent reform bill that is pending in Congress [10].

While trademarks would seem to have little to do with engineering, again technological changes have led to "cybersquatting" and legislation to remedy the problem.

For trade secrets, recent news stories provide case studies where individuals have been accused of trade secret theft (e.g., [11]).

The course is taught using a combination of lecture and discussion formats. Student performance is evaluated through of three written assignments (one short paper and two term papers), student presentations, participation, and quizzes on moral theory and IP concepts.

4. CONCLUSION

This paper has described a new course that covers IP basics and the interaction between technical innovation, IP owners, and society using a framework of moral theory and ethics. Results from its first offering in Spring 2009 are promising – students participated enthusiastically in class discussions, identified and wrote about interesting case studies in assignments, and expressed high confidence that course outcomes were achieved in an end-of-semester survey. Future work will include the development of additional case studies and opening the course to students from non-engineering majors.

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