

Ethics in Engineering Practice
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Lecture - 04
Professional Practice in Engineering

Welcome today we are going to discuss the Professional Practice in Engineering. In this session we will try to look into the factor, what is the profession, how engineering is a profession and things thereafter. So, let us look into the outline of the discussion of this module.

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The slide is titled "Outline of the module" and lists the following topics:

- ❖ Defining Profession
- ❖ Attributes of a profession
- ❖ Engineering as profession
- ❖ Difference in Engineering and other professions
- ❖ Ethical dilemma
- ❖ Code of Ethics
- ❖ What a code of ethics is not
- ❖ Essentialities of a code of ethic
- ❖ Abuse of codes
- ❖ Ethical Relativism
- ❖ Cases for discussion
- ❖ Code of ethics for engineers in India

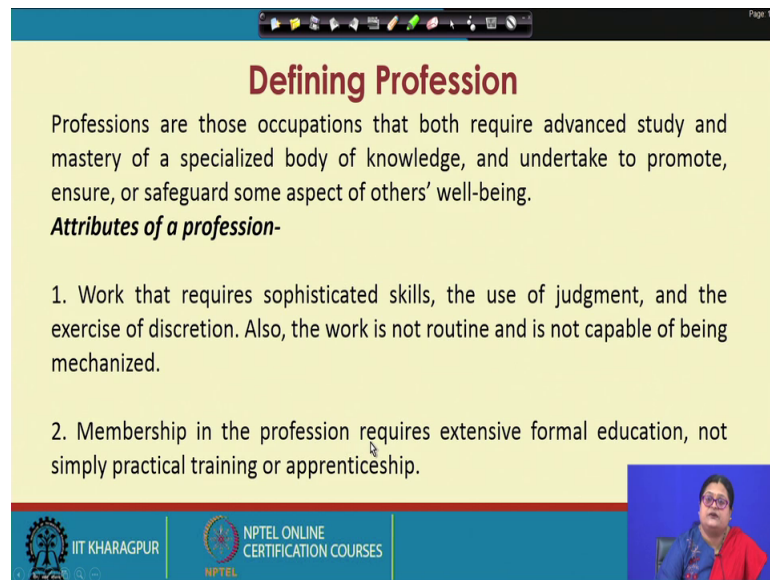
Source: Ethics in Engineering Practice and Research, Caroline Whitback, Cambridge University Press and Introduction to Engineering Ethics, Martin and Schinzinger, McGraw-Hill

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So, this module will define what is a profession, attributes of a profession engineering as a profession, difference in engineering and other professions, ethical dilemma, codes of ethics, what a code of ethics is not, essentials of a code of ethics, abuses of codes, ethical relativism, cases for discussion and code of ethics for engineers in India.

So, we will discuss this throughout this module one by one and starting with the definition of what is the profession. Time and again we have been mentioning like engineering is a profession.

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The slide is titled "Defining Profession" in a bold, dark red font. Below the title, the text reads: "Professions are those occupations that both require advanced study and mastery of a specialized body of knowledge, and undertake to promote, ensure, or safeguard some aspect of others' well-being." This is followed by the heading "Attributes of a profession-" in bold black text. A numbered list contains two items: "1. Work that requires sophisticated skills, the use of judgment, and the exercise of discretion. Also, the work is not routine and is not capable of being mechanized." and "2. Membership in the profession requires extensive formal education, not simply practical training or apprenticeship." The slide footer includes the IIT KHARAGPUR logo, the NPTEL ONLINE CERTIFICATION COURSES logo, and a small video inset of a woman in a red shirt speaking.

So, let us first define what is a profession? So, professions are those occupations that require both advanced study and mastery of a specialized body of knowledge, this word specialized body of knowledge is important over here and, to undertake to promote ensure, or safeguard some aspect of others well being.

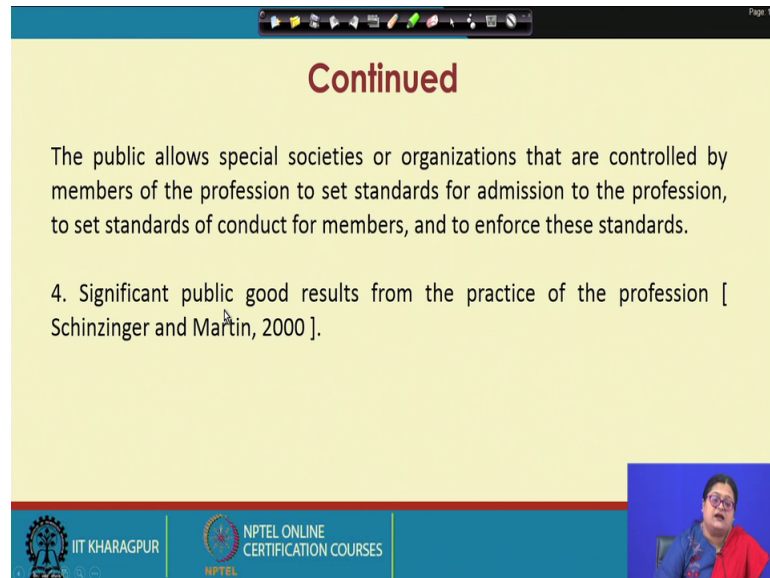
So, if we define what is a profession, it has three important aspects like, it requires advanced study and mastery not in any general field of knowledge, but in a specialized body of knowledge and also to undertake to promote, ensure, or safeguard some aspect of others well being are the three important key points in defining what is a profession.

Now, when we discuss about what are the attributes of a profession. So, first attribute is it requires sophisticated skills, use of judgment and the exercise of discretion, we will discuss what judgment and discretion is after we finish of this definition and move further. Also the work is not routine and is not capable of being mechanized. So, here you understand like it requires some degree of expertise in making decisions about the problems that you are solving as a part of being a professional.

So, work that requires sophisticated skills, use of judgment and discretion use of judgment and, exercise of discretion and, also the work is not a routine in nature and is not capable of being mechanized. Number 2, the membership in the profession requires extensive formal education not simple practical training or apprenticeship. So, you have to have mastery and advanced knowledge in the field before you can qualify to be a

professional in a particular field and, not simple practical training or apprenticeship is going to qualify you to be a professional.

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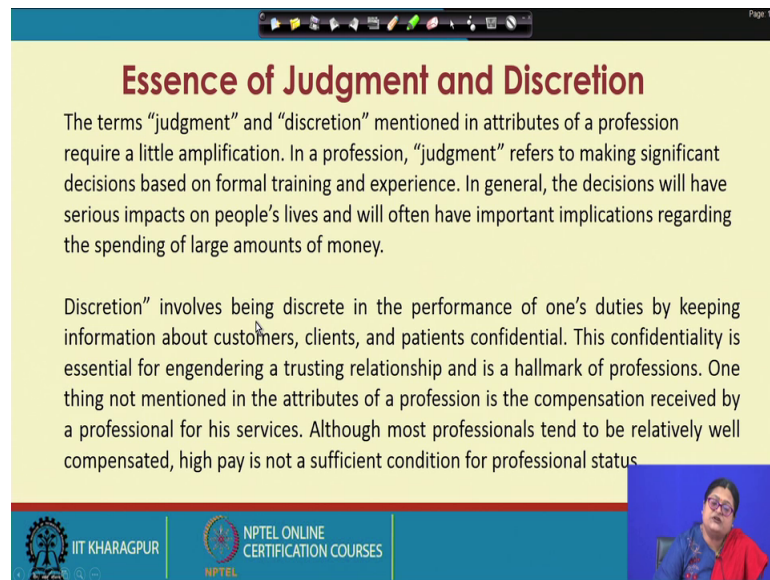
The public allows special societies or organizations that are controlled by members of the profession to set standards for admission to the profession, to set standards of conduct for members, and to enforce these standards.

4. Significant public good results from the practice of the profession [Schinzinger and Martin, 2000].

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Then, the public allows special societies or organizations that are controlled by members of the professions to set standards for admission to the profession and to see to set standards of conduct for members and to enforce these standards. So, every professional body defines a standard for admission who will be admitted into that profession, what are the set rules of conduct for the members of that profession and, how to enforce that standards. And number 4, significant public good results from the practice of the profession. So, it is looking into others well being welfare and, significant public good results from the practice of the profession.

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Essence of Judgment and Discretion

The terms “judgment” and “discretion” mentioned in attributes of a profession require a little amplification. In a profession, “judgment” refers to making significant decisions based on formal training and experience. In general, the decisions will have serious impacts on people’s lives and will often have important implications regarding the spending of large amounts of money.

Discretion” involves being discrete in the performance of one’s duties by keeping information about customers, clients, and patients confidential. This confidentiality is essential for engendering a trusting relationship and is a hallmark of professions. One thing not mentioned in the attributes of a profession is the compensation received by a professional for his services. Although most professionals tend to be relatively well compensated, high pay is not a sufficient condition for professional status

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Now, as we told we will discuss about what is judgment and discretion in details, let us see what are these two things so, the word judgment and discretion are attributes of a particular profession and, which requires a little amplification. So, in a profession judgment refers to making significant decision based on formal training and experience.

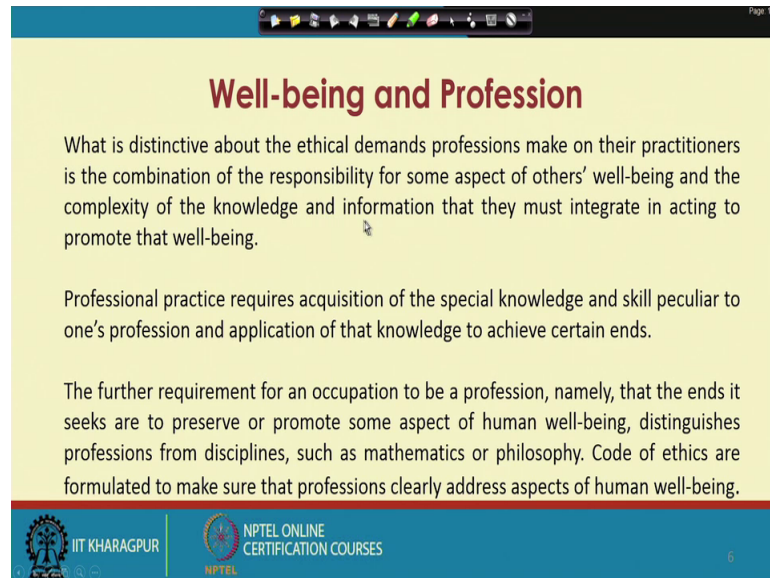
So, based on your experience and formal training you have got that expertise, which helps you to make a significant decision based on that give you an expertise to judge, in general the decisions will have serious impacts on people’s lives and will offer have important implication regarding the spending of large amount of money. So, those which are important decisions and which have great impact on the life of people so, these are you like make your judgments regarding these type of decisions.

Discretion involves being discrete in the performance of one’s duties by keeping information about customers, clients and patients, confidential. These confidential it is essential for engineering a trusting relationship and is the hallmark of profession, one thing not mentioned in the attributes of a profession is the compensation received by the professional for a services.

Although most professionals tend to be relatively well compensated, high pay is not a sufficient condition for a professional status. So, why because pay never determines the degree of judgment that you have to take for a particular decision that you have to make, the degree of discretion that you have to show regarding the confidentiality and

trustworthiness of the information, that others may share with you. The intensity and the degree of these two things will determine the importance of the profession; pay is a very secondary related to these things.

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Well-being and Profession

What is distinctive about the ethical demands professions make on their practitioners is the combination of the responsibility for some aspect of others' well-being and the complexity of the knowledge and information that they must integrate in acting to promote that well-being.

Professional practice requires acquisition of the special knowledge and skill peculiar to one's profession and application of that knowledge to achieve certain ends.

The further requirement for an occupation to be a profession, namely, that the ends it seeks are to preserve or promote some aspect of human well-being, distinguishes professions from disciplines, such as mathematics or philosophy. Code of ethics are formulated to make sure that professions clearly address aspects of human well-being.

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Now, how well being and profession is linked is the ethical demands of a profession make on the practitioners, is the combination of the responsibilities of the for a some aspects of others well being and the complexity of the knowledge and, information that they must integrate in order to promote that well being.

So, based on ethical demands of the profession we can tell like, it is a complex like interplay of the responsibilities that may people may have for the others well being and the degree of knowledge judgment and discretion, that you have to like demonstrate why you are making those judgments.

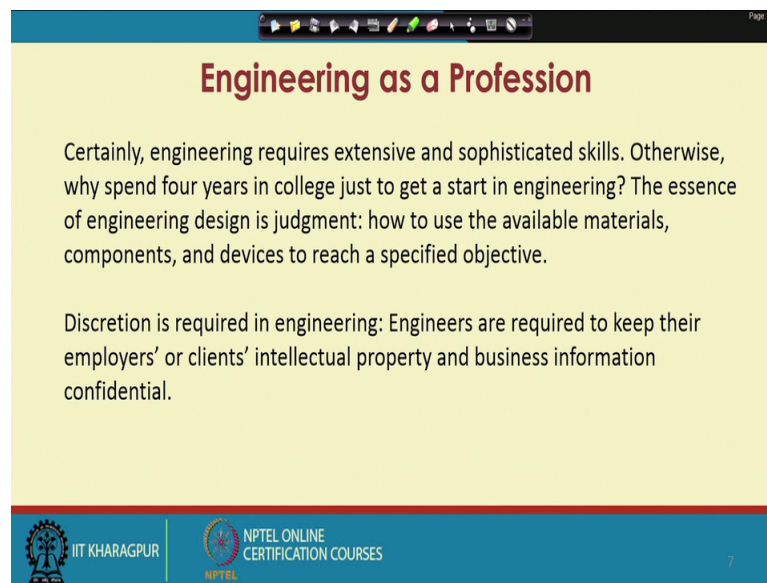
Professional practice requires acquisition of special knowledge and skill, peculiar to ones profession and application of that knowledge to achieve certain ends. So, it is not enough to acquire particular knowledge and skill, which are like peculiar to ones profession, but in order to be termed as a professional you need to apply those knowledge to certain to achieve certain ends and, that end is of course, the well being of others.

The further requirement for an occupation to be a profession, namely that the end it seeks are to preserve, or promote some aspects of human well being. Distinguishes professions

from other disciplines like mathematics, or philosophy code ethics are formulated to make sure profession clearly as addresses aspects of human well being.

So, when code of ethics means what you are supposed to do, what are your primary responsibilities and how you apply your knowledge to the welfare of the other people, these are codes of ethics which guidelines framed under codes of ethics, which ensures the aspects of human well being.

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The slide is titled "Engineering as a Profession" in a bold, dark red font. The background is a light yellow color. The text on the slide is as follows:

Certainly, engineering requires extensive and sophisticated skills. Otherwise, why spend four years in college just to get a start in engineering? The essence of engineering design is judgment: how to use the available materials, components, and devices to reach a specified objective.

Discretion is required in engineering: Engineers are required to keep their employers' or clients' intellectual property and business information confidential.

At the bottom of the slide, there is a blue footer bar containing the IIT Kharagpur logo on the left and the text "NPTEL ONLINE CERTIFICATION COURSES" on the right. A small number "7" is visible in the bottom right corner of the slide.

Now, when we have discussed what is a profession. Now, we are going to discuss how engineering is a profession ok, now we are going to discuss how engineering is a profession. So, when you try to map we find like engineering requires extensive and sophisticated skills. Otherwise like if it is not required then why do you spend so, much time in may be nearly four years in college to get to start your job in engineering?

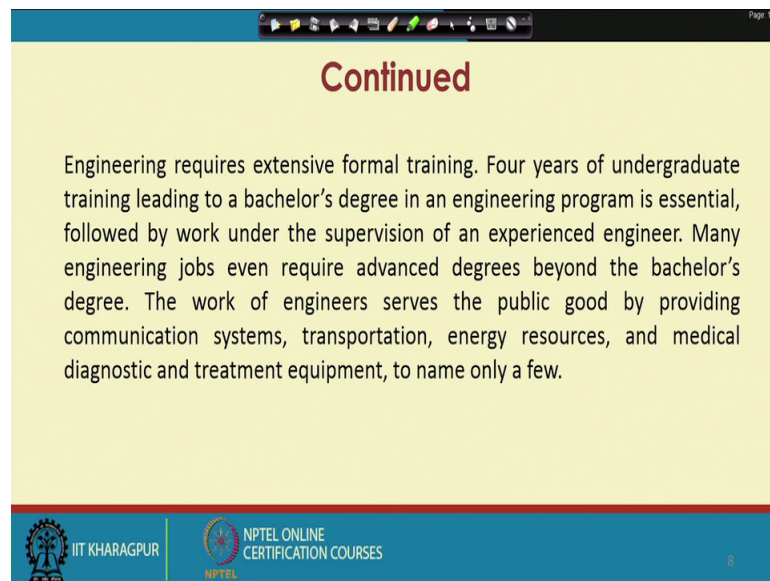
The essence of engineering design is the judgment: how to use the available materials components and devices to reach a specific objective. Discretion is also an ingrained part in engineering, because engineers are required to keep their employers, or clients' intellectual property and business information confidential.

Because they are the person who are involved in the process and design they get to know many information about the which are very crucial information about the employers and the clients, or other intellectual which is their intellectual property and, it requires lot of

discretion on their part to not to share this business information with outsiders and maintain their confidentiality about it.

So, what we find over here engineering qualifies as a profession, because it requires extensive and sophisticated skills, because it has a components of judgment and discretion also involved in it.

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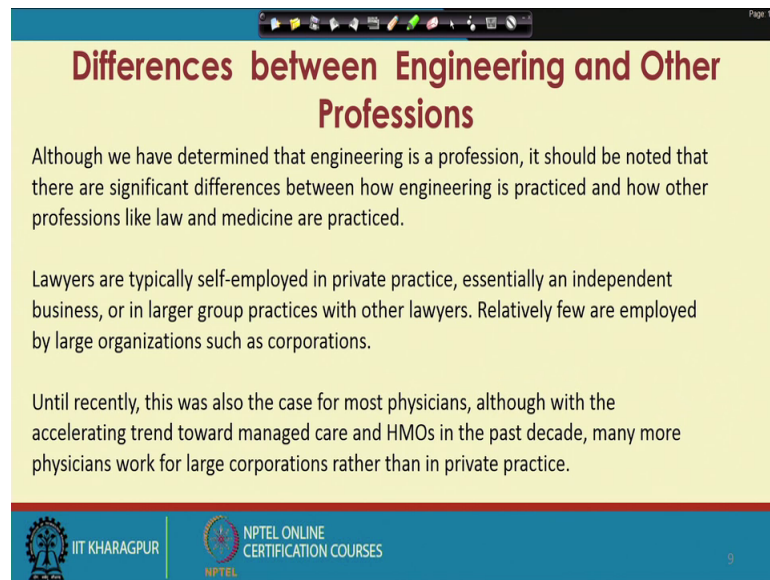
The slide is titled "Continued" in a large, bold, red font. Below the title, there is a paragraph of text: "Engineering requires extensive formal training. Four years of undergraduate training leading to a bachelor's degree in an engineering program is essential, followed by work under the supervision of an experienced engineer. Many engineering jobs even require advanced degrees beyond the bachelor's degree. The work of engineers serves the public good by providing communication systems, transportation, energy resources, and medical diagnostic and treatment equipment, to name only a few." At the bottom of the slide, there are two logos: the IIT Kharagpur logo on the left and the NPTEL Online Certification Courses logo on the right. The NPTEL logo includes the text "NPTEL ONLINE CERTIFICATION COURSES" and "NPTEL".

Also engineering requires extensive formal training. So, four years of undergraduate training leading to a bachelor degree in engineering program is essential. After this it is followed by work under the supervision of an expand like experienced engineer, then more many engineering jobs require its advanced degrees we are the bachelors degree.

Also what we find the work of engineer serves the public good, by providing communication system transportation energy resources and medical diagnostic, and treatment equipment these are only a few. So, the products that are developed out of these engineering practices are directed towards the public good by providing services like communication system, transportation energy resources, medical treatments diagnostic equipments, these are only to name a few there are large gamut of things.

So, beyond the three qualities of having an advanced knowledge, the judgment and discretion, engineering requires formal training, engineering requires like, it is working for the public good and so, it qualifies to be a profession.

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Differences between Engineering and Other Professions

Although we have determined that engineering is a profession, it should be noted that there are significant differences between how engineering is practiced and how other professions like law and medicine are practiced.

Lawyers are typically self-employed in private practice, essentially an independent business, or in larger group practices with other lawyers. Relatively few are employed by large organizations such as corporations.

Until recently, this was also the case for most physicians, although with the accelerating trend toward managed care and HMOs in the past decade, many more physicians work for large corporations rather than in private practice.

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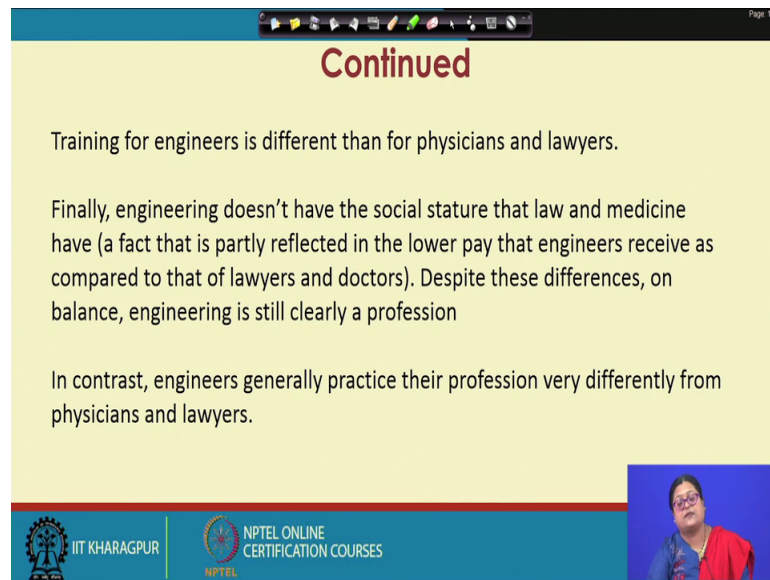
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So, because it fulfills all the five important parameters required for it to be a profession now, faith engineering is a profession and there are other professions as well, we need to differentiate between the engineering as a profession and other professions. So, that we can understand if there are any special requirements for engineering as a profession, if there are any special challenges of engineering as a profession, which may or may not be a part of other professions.

So, although we have just noted that engineering is a profession, it should be noted there are significant differences, in how engineering is practiced and how other professions like law and medicine are practiced. Like lawyers and are generally self employed essentially an independent business, or in a large group practices with other lawyers, relatively few are employed when large organizations are as corporations.

So, until recently then this was also the trend for physicians, although with the accelerating trend towards managed care and HMOs in the past decade, many more physicians work for large corporation rather than in private practice.

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Training for engineers is different than for physicians and lawyers.

Finally, engineering doesn't have the social stature that law and medicine have (a fact that is partly reflected in the lower pay that engineers receive as compared to that of lawyers and doctors). Despite these differences, on balance, engineering is still clearly a profession

In contrast, engineers generally practice their profession very differently from physicians and lawyers.

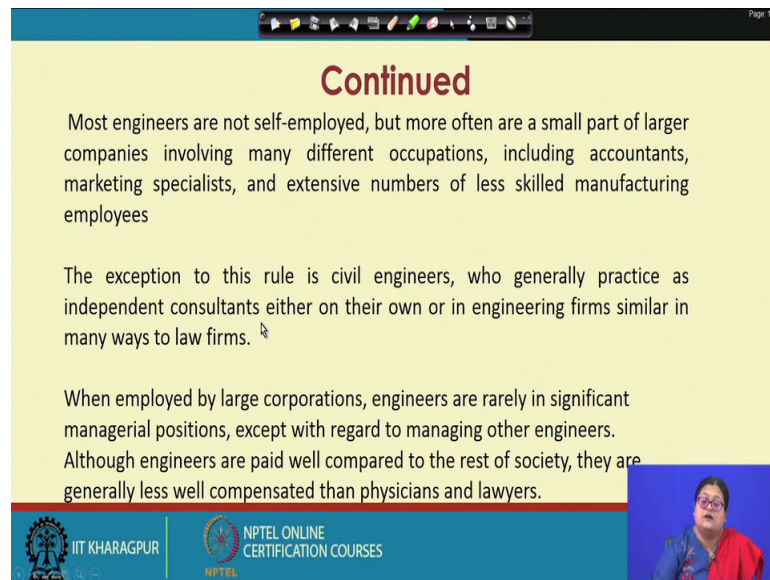
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Again training for engineers is different rather than for physicians, that for physicians and lawyers. Finally, engineering does not have the social stature that law and medicine have generally what happens is engineers, if you are going by maybe the pay structure, though it is changing are not that highly paid as that of doctors.

So, but still because it fulfills all the five important criteria to be a profession engineering is a profession and, because it has the come money the state monetary status does not always define the status of a profession and, in engineering lot of judgment and discretion is required along with the application of your specialized knowledge engineering is a very important profession.

And also the engineers practice their professions in a very different way from the physicians and lawyers, because physicians and lawyers are generally the practice independently more so, the lawyers, but engineers are generally like they get employed.

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Most engineers are not self-employed, but more often are a small part of larger companies involving many different occupations, including accountants, marketing specialists, and extensive numbers of less skilled manufacturing employees

The exception to this rule is civil engineers, who generally practice as independent consultants either on their own or in engineering firms similar in many ways to law firms.

When employed by large corporations, engineers are rarely in significant managerial positions, except with regard to managing other engineers. Although engineers are paid well compared to the rest of society, they are generally less well compensated than physicians and lawyers.

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So, most engineers are not self employed, but most often there is part of a larger companies involving, many different occupations including accountants marketing specialists and extensive numbers of less skilled manufacturing employees. So, what we find like, because engineers are a part of a large corporation, or they are part of an organization they have to day in and day out interact with people from other professions also.

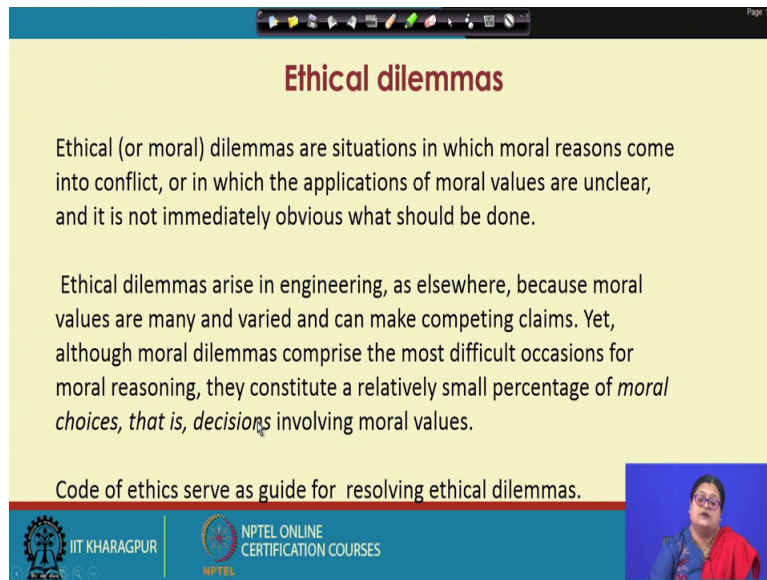
And like be in synergy with them which is a challenge and which may, or may not be present with the professional like the practice for the physical physicians and the lawyers, where there are any independent practice, but if yes the physicians are part of in a hospital system, then they also have to follow the same thing, like interacting with people from different occupations.

The exception to this rule is civil engineers, who generally practice in independent consultants, either in their own or an engineer firms similar to many law firms so, civil engineers are generally practices independent consultants.

So, what happened when the employees are employed in large corporation is engineers are rarely in significant managerial positions, except with regard to managing other engineers. So, what happens like, because they are part of a large corporation. So, at the start you cannot find like at the start of your carrier you cannot expect yourself to be upgraded to a managerial position.

So, what best you can expect at the start of your carrier is the like, you can be a supervisor to other managers, or other engineers. Although engineers are paid well compared to the rest of the society, they are generally less well compensated than physicians and lawyers.

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Ethical dilemmas

Ethical (or moral) dilemmas are situations in which moral reasons come into conflict, or in which the applications of moral values are unclear, and it is not immediately obvious what should be done.

Ethical dilemmas arise in engineering, as elsewhere, because moral values are many and varied and can make competing claims. Yet, although moral dilemmas comprise the most difficult occasions for moral reasoning, they constitute a relatively small percentage of *moral choices, that is, decisions* involving moral values.

Code of ethics serve as guide for resolving ethical dilemmas.

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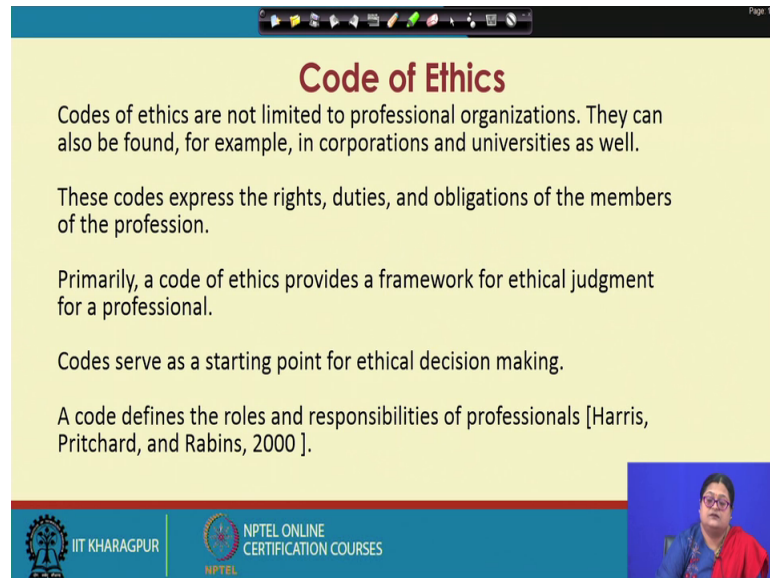
One important part of the profession of engineers and engineering practice is to deal with ethical dilemma, because there are many stakeholders involved and, because the welfare of the public at large is the major focus, then there could be many ethical dilemmas in the process of engineering practice. And we have discussed this time and again. So, here we will try to elaborate on what are ethical dilemmas.

Ethical or moral dilemmas are situations in which moral reasons come into conflict, or in which the applications of moral values are unclear and, it is not immediately obvious what should be done. So, if we are having conflicts between two moral reasons or how to apply the moral values, if it is not clear and, if it is the outcome that you get from it is not obvious immediately there, it may have a ethical dilemma.

Ethical dilemmas arise in engineering because moral values are many and varied and, can make competing claims. Yet, although moral dilemmas comprise the most difficult occasion for moral reasoning so, they constitute a relatively small percentage of moral choices that is decision involving moral values so, they these are small percentages of moral choices, but these are very important parts of the how to make the choice.

So, when you talking of ethical dilemma and we talking of moral choices and, how to make a decision, because either way we go it will have some pros and cons so, in that case codes of ethics will serve as the guideline for resolving ethical dilemmas.

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Code of Ethics

- Codes of ethics are not limited to professional organizations. They can also be found, for example, in corporations and universities as well.
- These codes express the rights, duties, and obligations of the members of the profession.
- Primarily, a code of ethics provides a framework for ethical judgment for a professional.
- Codes serve as a starting point for ethical decision making.
- A code defines the roles and responsibilities of professionals [Harris, Pritchard, and Rabins, 2000].

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Next, we will focus into understanding what is codes of ethics, what it is, what it is not how to develop the code of ethics, how it should be stated clearly. So, that it acts as a guideline and to show us the track, when we are in situations of dilemma.

So, let us see what is meant by codes of ethics. So, let us see what is meant by the codes of ethics. So, course of ethics we must understand it is not limited to professional organizations, they can be found in corporations in universities codes of ethics is represents like how thing should be done what is the right way to do the things, what should be done what should be avoided etcetera. These course expresses the rights duties and obligations of the members of the profession.

Primarily a code of ethics provides a framework for ethical judgment for a profession. So, when you are in a point of dilemma, you have to make a judgment and you are not able to understand how to proceed for it, code of ethics provides your framework, or guideline to for your ethical judgment. Code serve as a starting point for ethical decision making. So, a code defines the roles and responsibilities of the professionals.

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What a code of ethics is not

It is important also to look at what a code of ethics is not. It is not a recipe for ethical behavior; as previously stated, it is only a framework for arriving at good ethical choices.

A code of ethics is never a substitute for sound judgment. A code of ethics is not a legal document.

A code of ethics doesn't create new moral or ethical principles.

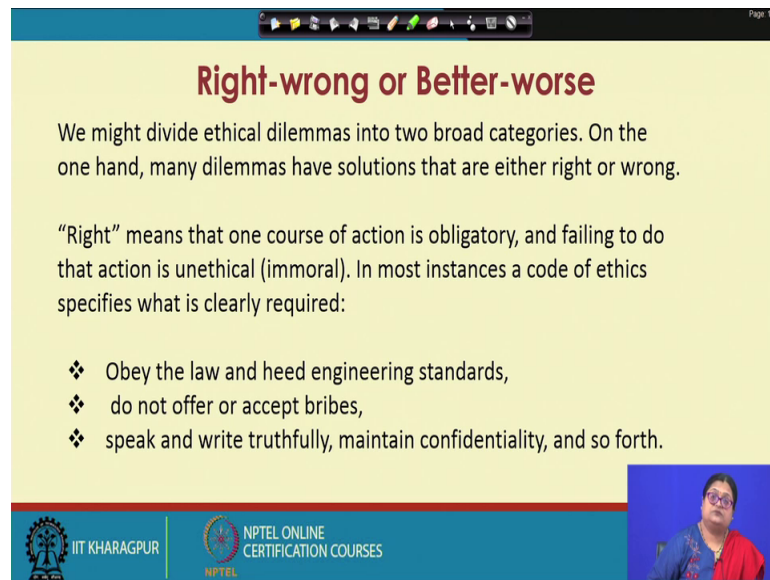
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So, what should be done, how it should be done, what should be avoided what should be encouraged these type of things, I mentioned in the course of ethics. Before we proceeded on to discussing before you proceed on to discussing, what is code of ethics let us focus into what code of ethics is not. It is also important to look into what code of ethics is not. It is not a recipe for ethical behavior as previously stated, it is only a framework for arriving at a good ethical choices.

A code of ethics is never a substitute for sound judgment, a code of ethics is not a legal document. And code of ethics does not create new moral or ethical principles. It only states given the set of rules and regulations this is the set of things that you are expected to do and, these are the things that you are expected not to do.

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Right-wrong or Better-worse

We might divide ethical dilemmas into two broad categories. On the one hand, many dilemmas have solutions that are either right or wrong.

“Right” means that one course of action is obligatory, and failing to do that action is unethical (immoral). In most instances a code of ethics specifies what is clearly required:

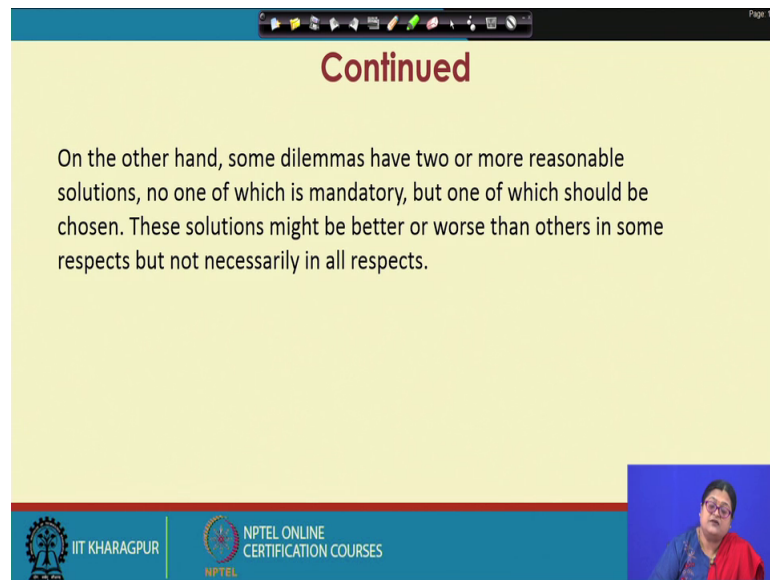
- ❖ Obey the law and heed engineering standards,
- ❖ do not offer or accept bribes,
- ❖ speak and write truthfully, maintain confidentiality, and so forth.

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So, with that we will go for further discussion of code of ethics and what it states. So, code of because code of ethics, addresses ethical dilemmas it is very important to first classify like, the ethical dilemmas if it can meet to any categorization.

So, what we find is ethical dilemmas, what we find that ethical dilemmas can be classified into two broad categories. On one hand, many dilemmas have solutions which are either right or wrong. So, right means the one course of action that is obligatory and, failing to do that action is unethical immoral, in most instances a code of ethics specifies what it clearly requires. Obey the law and heed engineering standards, do not offer a or accept bribes speak and write truthfully maintain confidentiality and so, forth.

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On the other hand, some dilemmas have two or more reasonable solutions, no one of which is mandatory, but one of which should be chosen. These solutions might be better or worse than others in some respects but not necessarily in all respects.

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On the other hand, some dilemma have two or more possible reasonable solutions, no one of which is mandatory, but one of which should be chosen. These solutions might be better or worse than others in some respects, but not necessarily all respects. So, it is a choice from like, a various options that you have and you have to like you choose one of them.

Now, when we have discussed about the two types of ethical dilemmas and, what the code of ethics is then and, now we will proceed to discussion of like the what are the different aspects of a code of ethics. And, we understand codes of ethics is for resolving situations of conflict. And here, now we will discuss in details the role played by the codes of ethics. So, what we find over here there are 8 different roles, which codes of ethics may play.

So, first is serving and protecting the public, second is providing guidance, third offering inspiration, fourth establishing shared standards, fifth supporting responsible professionals, sixth contributing to education seventh deterring wrongdoing and eighth strengthening a professions image. So, these are eight different codes of ethics. In the next lecture we are going to elaborate on each of these codes of ethics, we will discuss scales to related to that and the engineering as a professional practice and, also we will discuss the code of ethics for engineers as stated in India.

Thank you.