

ETHICS IN ENGINEERING

Lecture 4 DISCUSSION

Wednesday, February 27, 2013

DISCUSSION

SOME EXAMPLES

(multi choice questions)

“Ethics” is best defined as

- I. a philosophical concept dealing with moral conduct
- II. a set of standards establishing right and wrong actions
- III. rules that describe your duty to society and to your fellow professionals
- IV. guidelines that help you make decisions
 - (A) I only
 - (B) II only
 - (C) I and III
 - (D) I, II, III, and IV

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Solution

Ethics describes moral conduct; right and wrong actions; and duty to society, your employer, your fellow professionals, and yourself. These rules help you make practical decisions.

Answer is D.

5. Which of the following terms is not related to ethics?

- (A) integrity
- (B) honesty
- (C) morality
- (D) profitability

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5. Ethical actions may or may not be profitable.

Answer is D.

Ethical behavior is invariant with respect to

- I. time
 - II. location
 - III. culture
- (A) I only
- (B) II only
- (C) III only
- (D) neither I, II, nor III

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Ethics are not universal. They depend on your culture.
Ethics of a culture change over time.

Answer is D.

Which of the following can override your ethical requirement to perform a thorough analysis and check of the work for your client?

- (A) time constraints
- (B) budgetary constraints
- (C) legal constraints, including subpoenas and judicial orders
- (D) other ethical obligations

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Solution

Ethical obligations to society can take precedence over ethical obligations to a particular person.

Answer is D.

Specifically, the ethics of engineers dealing with others need to be considered in the following order from highest to lowest priority.

- society and the public
- the law
- the engineering profession
- the engineer's client
- the engineer's firm
- other involved engineers
- the engineer personally

4. Complete the sentence: “Guidelines of ethical behavior among engineers are needed because

- (A) engineers are analytical and they don’t always think in terms of right or wrong.”
- (B) all people, including engineers, are inherently unethical.”
- (C) rules of ethics are easily forgotten.”
- (D) it is easy for engineers to take advantage of clients.”

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4. Untrained members of society are at the mercy of the professionals (e.g., doctors, lawyers, engineers) they employ. Even a cab driver can take advantage of a new tourist who doesn’t know the shortest route between two points. In many cases, the unsuspecting public needs protection from unscrupulous professionals, engineers included, who act in their own interest.

Which of the following principles is not embodied in codes of ethics for engineering consultants?

- I. Consulting engineers will place service to humankind above personal gain.
 - II. Consulting engineers will serve clients faithfully, honestly, and professionally.
 - III. Consulting engineers will be fair and will act with integrity and courtesy.
 - IV. Consulting engineers will encourage the development of the engineering and consulting profession.
- (A) I
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Solution

Codes of ethics for consulting engineers contain provisions pertaining to all four principles.

Answer is D.

Two engineers submitted sealed bids to a prospective client for a design project. The client told engineer A how much engineer B had bid and invited engineer A to beat that amount. Engineer A really wants the project and honestly believes he can do a better job than engineer B. What should he do?

- (A) He should submit another quote, but only if he can perform the work adequately at the reduced price.
- (B) He should withdraw from consideration for the project.
- (C) He should remain in consideration for the project, but not change his bid.
- (D) He should bargain with the client for the cost of the work.

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Solution

It would be unfair and unethical for engineer A to submit another bid. Depending upon the regulating agency, it may also be illegal. He does not, however, have to remove himself from consideration for the project.

Answer is C.

While supervising a construction project in a developing country, an engineer discovers that his client's project manager is treating laborers in an unsafe and inhumane (but for that country, legal) manner. When he protests, the engineer is told by company executives that the company has no choice in the matter if it wishes to remain competitive in the region, and he should just accept this as the way things are. What, if anything, would ethics require the engineer to do?

- (A) Take no action—the company is acting in a perfectly legal manner.
- (B) Withdraw from the project, returning any fees he may already have received.
- (C) Report the company to the proper authorities for its human rights abuses.
- (D) Assist the laborers in organizing a strike to obtain better working conditions.

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- (A) Take no action—the company is acting in a perfectly legal manner.
- (B) Withdraw from the project. He may already have invested time and money in the project.
- (C) Report the company to the appropriate organization for its human rights violations.
- (D) Assist the laborers in forming a union to demand better working conditions.

Solution

The company hasn't broken any laws, so there is no one to report them to, but it is using unethical business practices. The engineer should at the least withdraw from the project as a form of protest and sever any business relations with the company. He could go so far as to assist the workers in protesting, but this might actually be illegal in the country in question. In any case, such activism would be a personal choice on the part of the engineer, not something he is obligated to do under a code of ethics.

Answer is B.

A local engineering professor acts as technical advisor for the city council in a town. A few weeks before the council is scheduled to award a large construction contract, the professor is approached by one of the competing companies and offered a consulting position. Under what circumstances would it be ethical to accept the job?

- (A) Both the company and the council must know about and approve of the arrangement.
- (B) The professor should arrange not to begin work until after the council's vote.
- (C) The professor may accept the job if the advisory position to the council is on a volunteer basis.
- (D) The professor must not participate in any discussions concerning the project for which the company is competing.

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Solution

The professor's association with the company is bound to influence any advice given to the board, even if the job doesn't start until later. Regardless of whether the board understands and approves of this situation, the engineer is obligated to withdraw from any of the council's discussions concerning the project.

An engineering professor with a professional engineering license and 20 years of experience in engineering education is asked to consult on a building design. Can the professor accept this request?

- (A) Yes, but she should review and comment on only those portions of the project in which she is qualified by education and experience.
- (B) Yes, a professor is a subject matter expert and as such should be fully competent to review the design.
- (C) Yes, as a licensed professional engineer, the professor has demonstrated her competence in engineering and may review the design.
- (D) No, there is a tremendous difference between working in academia and having professional experience. The review should be conducted by a practicing engineer.

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- (C) Yes, as a licensed professional engineer, the professor has demonstrated her competence in engineering and is working in a field in which she has experience. To consult on the building design.
- (D) No, there is no guarantee that a professor with 20 years of experience is fully knowledgeable of all current design procedures and practices.

Solution

It is perfectly legal and ethical for the professor to consult on the building design. She should, however, review and comment on only those portions of the design that deal with matters in which she is technically competent; the fact that she is a professor with 20 years of experience does not necessarily mean that she is fully knowledgeable of all current design procedures and practices.

Answer is A.

6. What actions can be taken by a state-regulating agency against a design professional who violates one or more of its rules of conduct?

- I. the professional's license may be revoked or suspended
- II. notice of the violation may be published in the local newspaper
- III. the professional may be asked to make restitution
- IV. the professional may be required to complete a course in ethics
 - (A) I and II
 - (B) III and IV
 - (C) III only
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6. All four punishments are commonly used by state engineering licensing boards.

Answer is D.

7. Which of the following activities is not commonly required by codes of ethics for engineers?

- (A) acting as a faithful agent or trustee for the client
- (B) accepting payment for services only from the client
- (C) submitting competitive bids to the client
- (D) spelling out all known conditions of bids and proposals

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7. Codes of ethics do not require engineers to submit competitive bids. In fact, competitive bids were prohibited in most engineering codes of ethics for many years.

Answer is C.

14. Which of the following methods of charging for professional services is unethical?

- (A) lump sum at the start of the job
- (B) per diem, billed monthly in advance
- (C) per hour, billed at the end of each week
- (D) retainer, plus per hour billed at the end of each week

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14. A lump sum at the start of the job is probably not wise, but it could be an ethical agreement. Billings for actual costs are ethical. It is common to charge a retainer at the start of a contract and to charge a percentage add-on for materials purchased for the benefit of the client. It is probably not ethical to bill for time you intend to spend in the future.

Answer is B.

- 11.** An engineering firm specializes in designing wood-framed houses. Which organizations would it be ethical for the owner of that firm to belong to?
- I. the local Rotary Club
 - II. the local Chamber of Commerce
 - III. a national timber-research foundation
 - IV. a pro-logging lobbying group
- (A) I and II
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11. The owner should not belong to organizations that would cast the profession in a bad light. Though self-serving, none of the organizations listed are illegal or committed to immoral actions. The owner would be able to inform his client of any connections, interests, or affiliations that might influence his judgment. Since the firm specializes in timber construction already, it is unlikely that any of these organizations would cause the owner to favor timber.

15. An engineer spends all of his free time (outside of work) gambling illegally. Is this a violation of ethical standards?

- (A) No, the engineer is entitled to a life outside of work.
- (B) No, the engineer's employer, his clients, and the public are not affected.
- (C) No, not as long as the engineer stays debt-free from the gambling activities.
- (D) Yes, the engineer should associate only with reputable persons and organizations.

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15. If the gambling activities were legitimate and legal, this wouldn't be a question, since legal activities are by definition, ethical. The gambling is illegal. Engineers should do nothing that brings them and their profession into disrepute. It is impossible to separate people from their professions. When engineers participate in disreputable activities, it casts the entire profession in a bad light.

Answer is D.

16. During routine inspections, a field engineer discovers that one of the company's pipelines is leaking hazardous chemicals into the environment. The engineer recommends that the line be shut down so that seals can be replaced and the pipe can be inspected more closely. His supervisor commends him on his thoroughness, and says the report will be passed on to the company's maintenance division. The engineer moves on to his next job, assuming things will be taken care of in a timely manner. While working in the area again several months later, the engineer notices that the problem hasn't been corrected and is in fact getting worse. What should the engineer do?

- (A) Give the matter some more time. In a large corporate environment, it is understandable that some things take longer than people would like them to.
- (B) Ask the supervisor to investigate what action has been taken on the matter.
- (C) Personally speak to the director of maintenance and insist that this project be given high priority.
- (D) Report the company to the EPA for allowing the situation to worsen without taking any preventative measures.

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- (A) Give the matter some more time. In a large corporate environment, it is understandable that some things take longer than people expect them to.
- (B) Ask the supervisor to investigate why no action has been taken on the matter.
- (C) Personally speak to the director of operations and insist that this project be given a higher priority.
- (D) Report the company to the EPA if he continues to witness the situation to worsen without taking any corrective measures.

16. While it is true that corporate bureaucracy tends to slow things down, several months is too lengthy a period for an environmental issue. On the other hand, it is by no means clear that the company is ignoring the situation. There could have been some action taken that the engineer is unaware of, or extenuating circumstances that are delaying the repair. To go outside the company or even over the head of his supervisor would be premature without more information. The engineer should ask his supervisor to look into the issue, and should only take further measures if he is dissatisfied with the response.

13. During the day, an engineer works for a scientific research laboratory doing government research. During the night, the engineer uses some of the lab's equipment to perform testing services for other consulting engineers. Why is this action probably unethical?

- (A) The laboratory has not given its permission for the equipment use.
- (B) The government contract prohibits misuse and misappropriation of the equipment.
- (C) The equipment may wear out or be broken by the engineer and the replacement cost will be borne by the government contract.
- (D) The engineer's fees to the consulting engineers can undercut local testing services' fees because the engineer has a lower overhead.

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13. Choices (A), (B), (C), and (D) may all be valid. However, the rationale for specific ethical prohibitions on using your employer's equipment for a second job is economic. When you don't have to pay for the equipment, you don't have to recover its purchase price in your fees for services.

Answer is D.

18. A relatively new engineering firm is considering running an advertisement for their services in the local newspaper. An ad agency has supplied them with four concepts. Of the four types of ads, which one(s) would be acceptable from the standpoint of professional ethics?

- I. an advertisement contrasting their successes over the past year with their nearest competitors' failures
 - II. an advertisement offering a free television to anyone who hires them for work valued at over \$10,000
 - III. an advertisement offering to beat the price of any other engineering firm for the same services
 - IV. an advertisement that tastefully depicts their logo against the backdrop of the Golden Gate Bridge
- (A) I and III
(B) I, III and IV
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18. None of the ads is acceptable from the standpoint of professional ethics. Concepts I and II are explicitly prohibited by the NCEES model code. Concept III demeans the profession of engineering by placing the emphasis on price as opposed to the quality of services. Concept IV is a misrepresentation; the picture of the Golden Gate Bridge in the background might lead some potential clients to believe that the engineering firm in question had some role in the design or construction of that project.

Answer is D.

20. An engineering firm receives much of its revenue from community construction projects. Which of the following activities would it be ethical for the firm to participate in?

- (A) Contribute to the campaigns of local politicians.
- (B) Donate money to the city council to help finance the building of a new city park.
- (C) Encourage employees to volunteer in community organizations.
- (D) Rent billboards to increase the company's name recognition.

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20. Contributing to local politics, either to individual campaigns or in the form of a gift to the city, would be seen as an attempt to gain political favor. The renting of billboards, while not as well-defined an issue, implies the sort of self-laudatory advertising that ethical professionals prefer to avoid. Encouraging the company's employees to volunteer their own time to the community is acceptable because the company is unlikely to get any specific benefit from it.

- 21.** A building designed by an engineer-architect team leaks during heavy rains. The building's owner may not be able to recover the cost of repairs because of
- (A) an act-of-God clause in the owner's building insurance policy
 - (B) a hold-harmless clause in the contract between the engineer and the architect
 - (C) the statute of limitations
 - (D) insolvency of the construction bonding company

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21. Insurance for building owners routinely covers water damage from rain leakage. A hold-harmless agreement between the engineer and the architect would not affect the client-engineer relationship. Insolvency of the original bonding company would be covered by back-up or federal insurance. A statute of limitations would prohibit the owner from collecting if the building was completed more than a certain number of years before.

19. An engineer works at a large firm for several years and participates in the development of a new production technique during that time. After leaving the company to start a consulting business, a competitor of the engineer's original employer asks for help with a similar problem, and the engineer is sure that the only solution is to use the process developed by the previous employer. Can the engineer ethically accept the job?

- (A) No. This would constitute accepting payment from more than one party for the same project.
- (B) No. The engineer would have to use information obtained while working for the original employer.
- (C) Yes. Because the engineer is no longer employed by the original company, any nondisclosure agreements are invalid.
- (D) Yes. It is understood that consulting engineers often work for competing clients, and that some knowledge transfer is inevitable.

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19. Nondisclosure agreements are not limited to the term of employment. Consulting engineers are expected to maintain the confidentiality of their clients' proprietary knowledge just as regular employees are, and often they have to sign nondisclosure agreements with each client. Using knowledge gained while working for one company to help another would not be considered working on the same project, but would be a breach of confidentiality.

Answer is B.

26. Which of the following acts would normally not be permitted by an engineering code of conduct?

- (A) revealing facts, data, or information obtained in a professional capacity without the consent of the client or employer
- (B) approving and sealing only those documents and surveys that conform to accepted engineering standards
- (C) providing the state board information of a violation of its engineering code of conduct by a registered engineer
- (D) undertaking assignments requiring assistance to complete some elements outside your area of expertise

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- (D) undertaking assignments requiring assistance to complete some elements outside your area of expertise

26. An engineer may not ethically reveal facts that have been confided.

Answer is A.

27. Which would be considered an ethical gift for an engineer to accept from a supplier?

- (A) a paid trip to an industry trade show
- (B) a ticket for a trip to Europe
- (C) a coffee mug with supplier's corporate logo
- (D) a \$100 check

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27. Choices A, B, and D are gifts with relatively high monetary value and, therefore, are unethical. An engineer should only accept items that are of insignificant value.

Answer is C.

- 28.** In dealing with suppliers, an engineer may
- (A) unduly delay vendor performance if the client agrees
 - (B) spend personal time outside of the contract to ensure adequate performance
 - (C) prepare plans containing ambiguous design-build references as cost-saving measures
 - (D) enforce plans and specifications to the letter, without regard to fairness

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28. An engineer not only may, but is required to, ensure performance consistent with plans and specifications. If a job is intentionally or unintentionally underbid, the engineer will have to use personal time to complete the project.

Answer is B.

- 29.** You are a city engineer in charge of receiving bids on behalf of the city council. A contractor's bid arrives with two tickets to a professional football game. The bid is the lowest received. What should you do?
- (A) Return the tickets and accept the bid.
 - (B) Return the tickets and reject the bid.
 - (C) Discard the tickets and accept the bid.
 - (D) Discard the tickets and reject the bid.

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29. Registrants should not accept gifts from parties expecting special consideration, so the tickets cannot be kept. They also should not be merely discarded, for several reasons. Inasmuch as the motive of the contractor is not known with certainty, in the absence of other bidding rules, the bid may be accepted.

Answer is A.

23. You are an engineer in charge of receiving bids for an upcoming project. One of the contractors bidding the job is your former employer. The former employer laid you off in a move to cut costs. Which of the following should you do?

- I. say nothing
 - II. inform your present employer of the situation
 - III. remain objective when reviewing the bids
- (A) I and II
(B) I and III
(C) II only
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23. Registrants should remain objective at all times and should notify their employers of conflicts of interest or situations that could influence the registrants' ability to make objective decisions.

- 25.** If one is aware that a registered engineer willfully violates a state's rule of professional conduct, one should
- (A) do nothing
 - (B) report the violation to the state's engineering registration board
 - (C) report the violation to the employer
 - (D) report the violation to the parties it affects

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25. A violation should be reported to the organization that has promulgated the rule.

Answer is B.

Complete the sentence: “If you check the calculations for a licensed (registered) friend who has gone into a consulting engineering business for himself/herself,

- (A) you should be paid for your work.”
- (B) your friend’s client should be told of your involvement.”
- (C) you do not need to be licensed or registered yourself.”
- (D) your friend assumes all the liability for your work.”

Complete the sentence: “If you check the calculations for a licensed (registered) friend who has gone into a consulting engineering business for himself/herself,

- (A) you should be paid for your work.”
- (B) your friend’s client should be told of your involvement.”
- (C) you do not need to be licensed or registered yourself.”
- (D) your friend assumes all the liability for your work.”

Solution

Whether you are paid or not is between you and your friend. Both you and your friend need to be licensed, and both of you can be held liable for the work. The client has a right to know who worked on the design, and your friend has an ethical obligation to notify the client.

Answer is B.