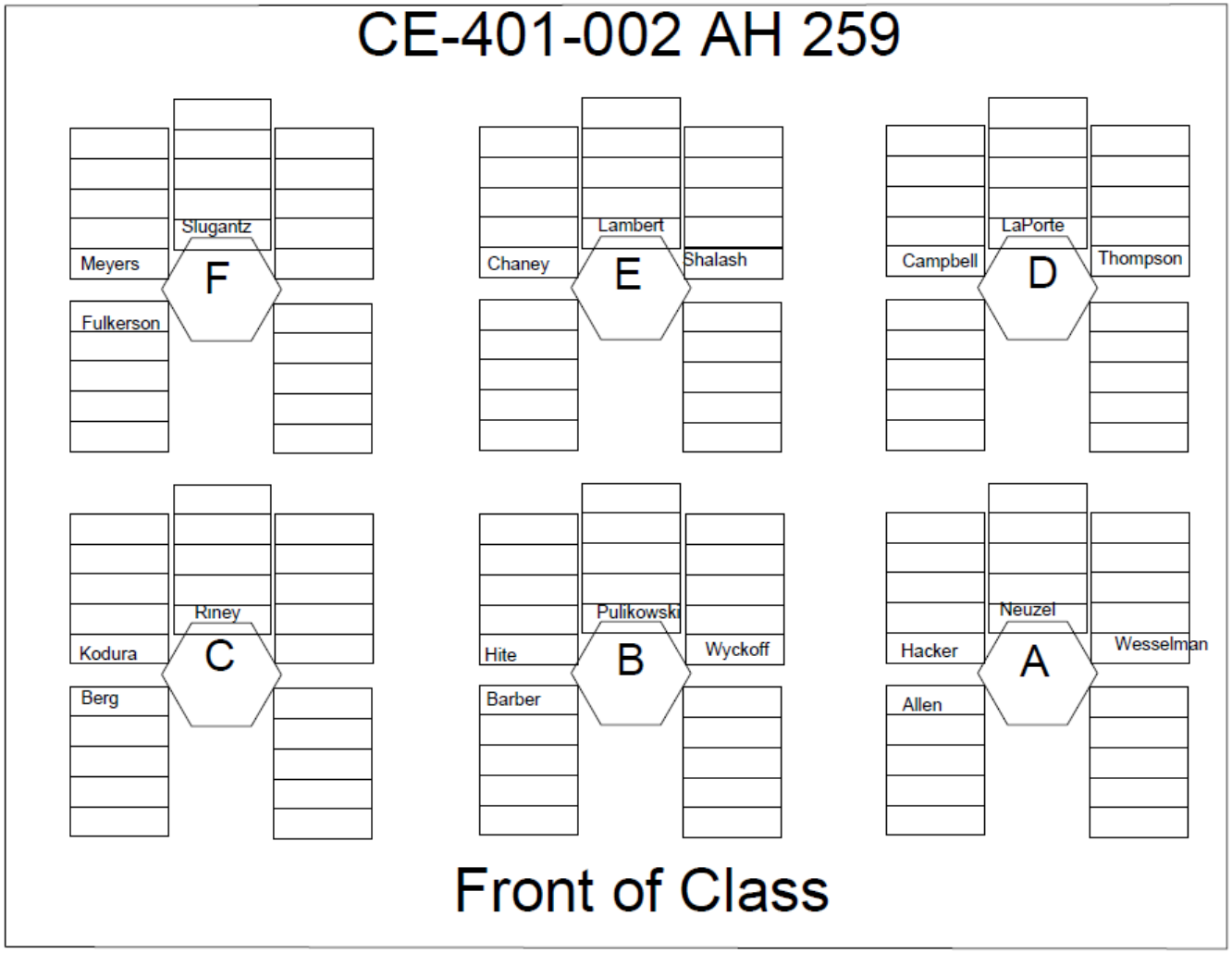
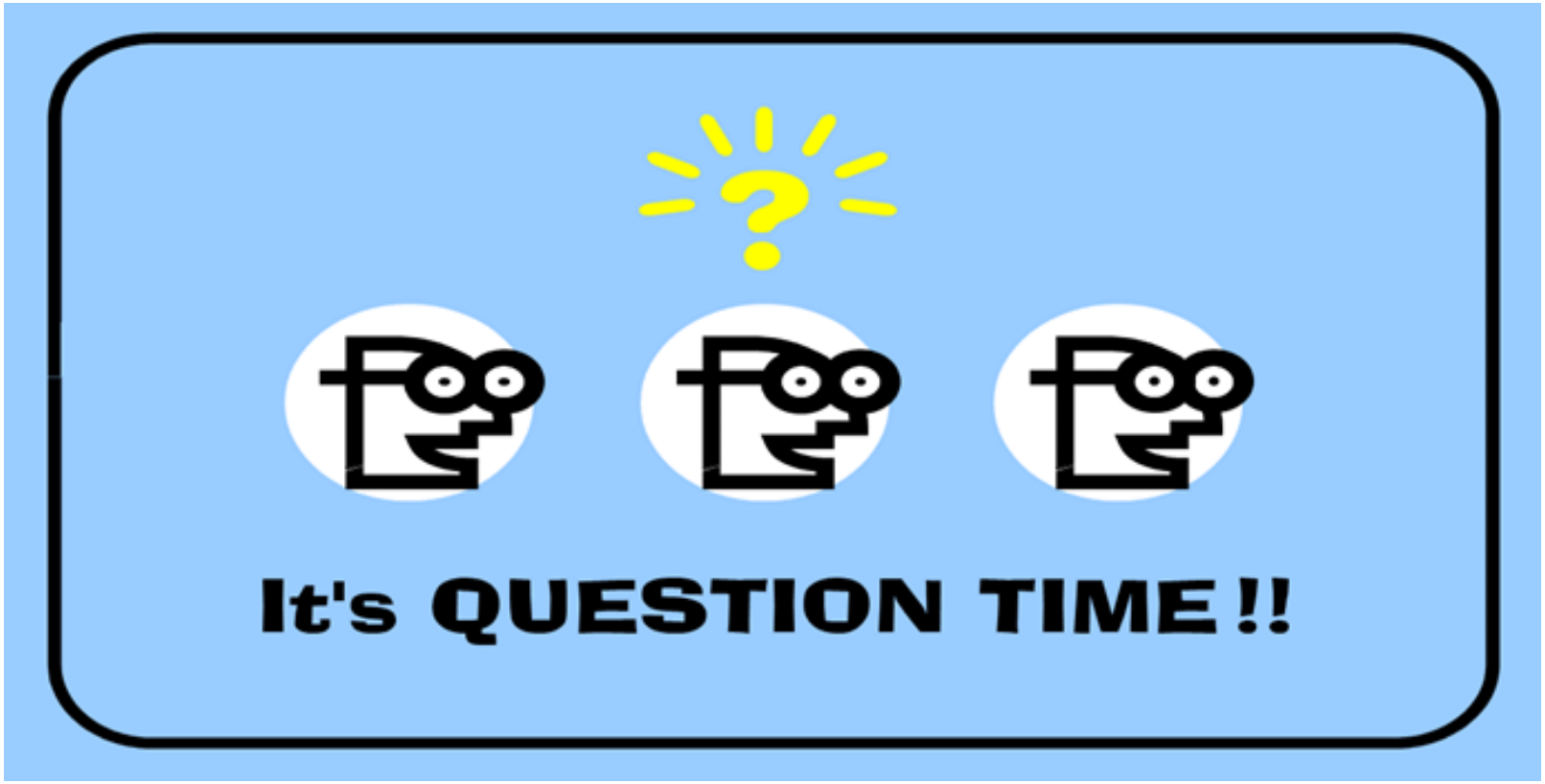
# CE 401 Civil Engineering Seminar
# Please Take Your Assigned Seat:

Win10 N*23



# CE 401 Civil Engineering Seminar
## General Questions:



# CE 401 Civil Engineering Seminar
# Seminar Procedures

**CE-401 Information**

- **As Questions and Issues arise, please bring:**
  - **All CE-401 issues to me at ce-401@Windstream.net; and**
  - **All CANVAS issues to buddy.hall@uky.edu, and me.**
- **How To Reach Me:**
  - **Communications with me MUST be by email to me at ce-401@windstream.net for:**
    - **Discussion Group Formation**
    - **Essay Group Formation**
    - **Essay Submittal, and**
    - **Pin Number Requests**
  - **For all other contacts, you may use email or CANVAS IM**
- **CE-401 Webpage:**
  - **http://richardcheeks.com/professor/New%20Front%20Page%20Format/CE-401_Front_Page.htm**

# CE 401 Civil Engineering Seminar
# Seminar Procedures

**CE-401 Information**

- **Class Schedule allocates 1:50 (110 Minutes) for each session**
  - **Most weeks will not require the full 110 minutes in class. The amount of time will depend on our ability to focus on the discussion questions and how many rabbits we chase in the process**
  - **Exceptions that will definitely require the full 2 hours:**
    - **Today because of all the groundwork to establish, and**
    - **The 2 Conflict Resolution Workshop Weeks.**
- **Only On Campus Fridays, Office is OHR 369 (Across from small break area)**
  - **Typical Friday Schedule:**
    - **Office 7:15 am to 7:45 am;**
    - **Section 1 Class 7:50 am to 9:30 +/-;**
    - **Office 9:35 +/- to 10:45 am;**
    - **Section 2 Class 10:50 am to 12:30 +/-; and**
  - **I will stay after last class as needed for course related purposes, and**
- **I will post the Weekly Power Points and other material available for download at the CE-401 webpage each Friday before leaving campus**

# CE 401 Civil Engineering Seminar Important CE-401 Documents:

## CE-401 Information Already Released via CANVAS

- **CE-401 Syllabus.pdf**
- **CE-401_IMPORTANT_INFORMATION_FOR_STUDENTS.pdf**
- **DISCUSSION GROUP PROCEDURES.pdf**
- **ESSAY.pdf**

# CE 401 Civil Engineering Seminar Important CE-401 Documents:

**CE-401 Information Available via CANVAS**

- **Syllabus – Go over entire Syllabus, and note my two points of emphasis:**
  - **Attendance and tardiness are major issues; Be Here! On time! and**
  - **NO USE of electronic devices in class without my prior approval**
- **Important Information Document**
  - **CE-401 Webpage and Access to GRADES area**
  - **Other resources available**
- **Procedures for Weekly Group Discussions**
  - **Become familiar with and follow the procedures and adhere to the timelines.**
  - **Establish your permanent discussion groups by Monday per the Procedures.**
  - **If I don't respond to your email, it is because I did not get the email.**
- **Essay Assignment - Due Date is March 8, 2024**
  - **Watershed event for final letter grade in CE 401**
  - **"Incident At Morales" – Essay Subject Material**
  - **Need to Understand the assignment before writing-Bring questions to me**
  - **Establish your essay teams by next Friday per the Assignment.**
  - **If I don't respond to your email, it is because I did not get the email.**

# CE 401 Civil Engineering Seminar Weekly Discussion Questions:

- **Thoughtful responses to the weekly discussion questions should prepare you for the upcoming class meeting**
  - **Questions are open ended to elicit a range of initial responses**
  - **A thoughtful response requires you to ID and connect dots, and**
  - **The more dots you can ID and connect, the better your response**
- **The goal of Consensus Building is to identify the group's <u>best</u> <u>response</u> to the issues.**
  - **Consensus building begins by identifying individual differences, followed by substantive probing of the issues to expand # of dots.**
  - **Even though initial individual views vary, there tends to be a best way to respond to these issues.**
  - **Therefore, when disagreement exists, some views are closer to the best response than others, and**
  - **A group's goal is to <u>identify and agree to the best response</u> to the questions.**

# CE 401 Civil Engineering Seminar
# Consensus Building:

- **A leader's goal is to bring the group to Agreement (Consensus) prior to posting the group's final response for the question confronting the group:**
  - **Effective teams strive for consensus, and**
  - **Successful leaders can build consensus**
- **Leaders should work with group members to reconcile differences and find agreement on these questions regardless of the disparity of views at the start.**
- **Nevertheless, despite earnest efforts, leaders cannot always bring groups to agreement prior to making a final decision, and when the group does not reach agreement:**
  - **Leaders must decide the issue and act for the group, in the face of dissent, *AND***
  - **Leaders must be able to explain the basis for acting in contradiction with the dissenting views**

# CE 401 Civil Engineering Seminar Consensus Building:

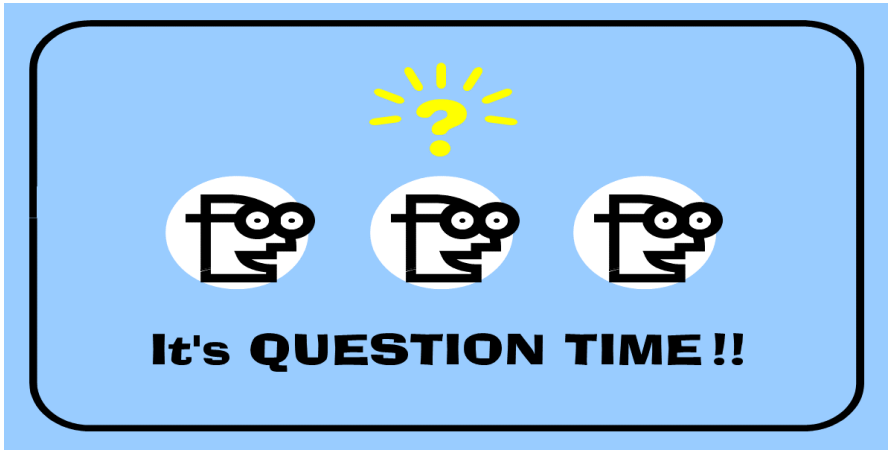
- **This week's discussion question activities provide a "dry run" with the process, which is:**
  - **Each Group Member should post an initial response to questions by Wednesday Noon after reading and viewing material.**
  - **The Group leader should engage members to develop and then post the group's consensus by 10 PM Thursday**
    - **When a leader posts a consensus, the leader acts on behalf of and for the group.**
    - **Absent a consensus, the leader must decide how to best answer the question.**
  - **The Group Leader is primary spokesperson in class for the group on the assigned discussion question**
- **Points are deducted for late or no participation by members**
- **Points are deducted for no final CONSENSUS post by leader**
- **Points may be deducted for non-responsive member posts**

# CE 401 Civil Engineering Seminar
# High Expectations:

- **You are senior civil engineering students**
  - **You did not get here with smoke and mirrors**
  - **You have prepared for a career of solving problems through analysis**
  - **I have high expectations for each of you.**
- **I will demonstrate my high expectations by:**
  - **Asking you some uncomfortable questions**
  - **Probing for additional information**
  - **Giving you time to achieve your best**
- **Expectations play a huge role in success**

# CE 401 Civil Engineering Seminar
# Question Time:

- Please do not hesitate to **ask questions**, sooner not later.
  - Ask questions **when we are gathered** for class sessions.
  - Email questions **as they arise** between our sessions.



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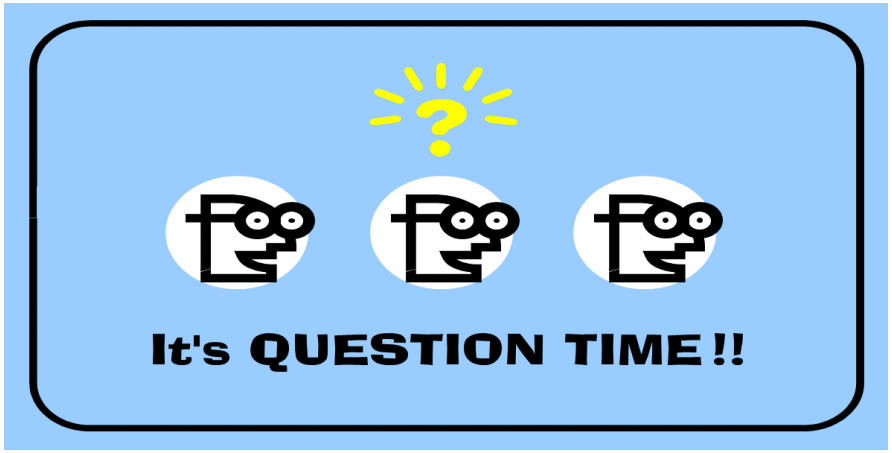


- Are there **questions about my attendance/tardiness policy**?

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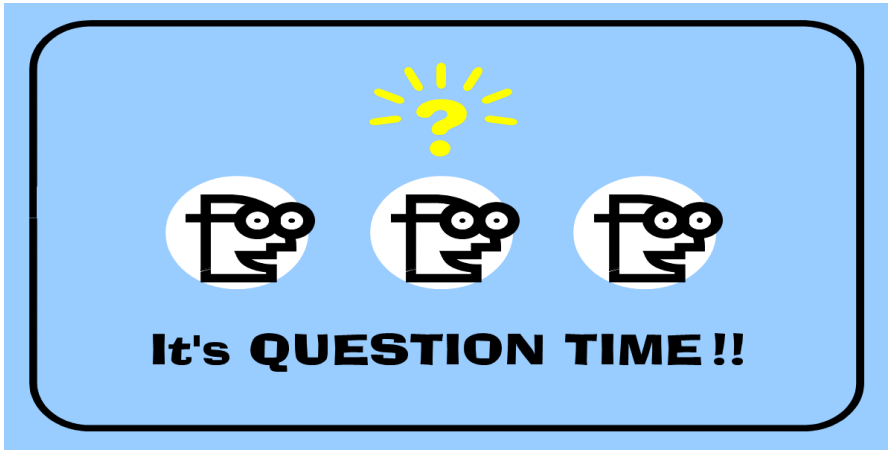


- Are there **questions about my attendance/tardiness policy**?
- Are there **questions about the consensus building process**?

# CE 401 Civil Engineering Seminar Question Time:

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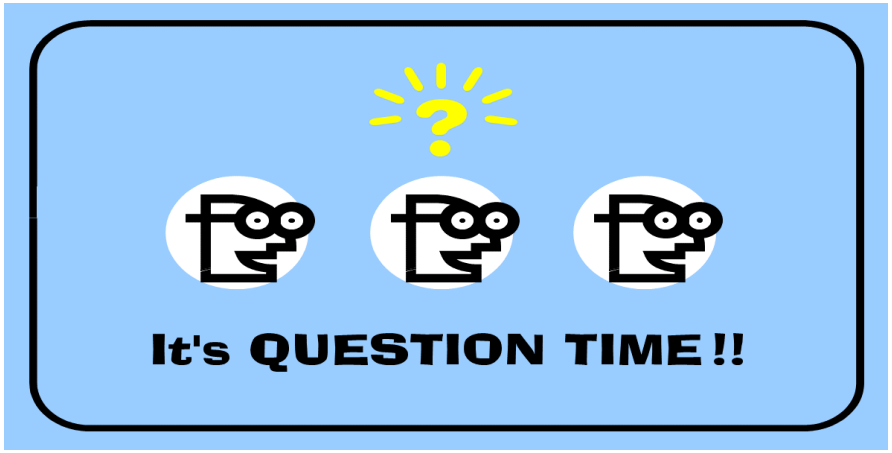



- Are there **questions about my attendance/tardiness policy**?
- Are there **questions about the consensus building process**?
- Are there **questions about my expectations** in Seminar?

# CE 401 Civil Engineering Seminar QUIZZES:

## Quizzes

- **10 Quizzes Worth Total 120 Points**
  - **1st and 10th quizzes worth 20 points each,**
  - **2nd through 9th quizzes worth 10 points each**
- **Quizzes are timed, 1 minute per point**
  - **Quizzes will occur each Thursday, starting next week**
  - **Quizzes open at noon and close at Midnight.**
- **Contact me in advance if you require:**
  - **Additional time to take quizzes, or**
  - **Different time window to take a quiz.**

# CE 401 Civil Engineering Seminar QUIZZES:

## Quizzes

- **Quizzes are an INDIVIDUAL ACTIVITY**
  - **In practice, many activities are collaborative while some activities require individual effort.**
  - **The Quizzes are an individual effort we use to satisfy ABET requirements to measure individual work**
  - **Do not collaborate on quizzes.**

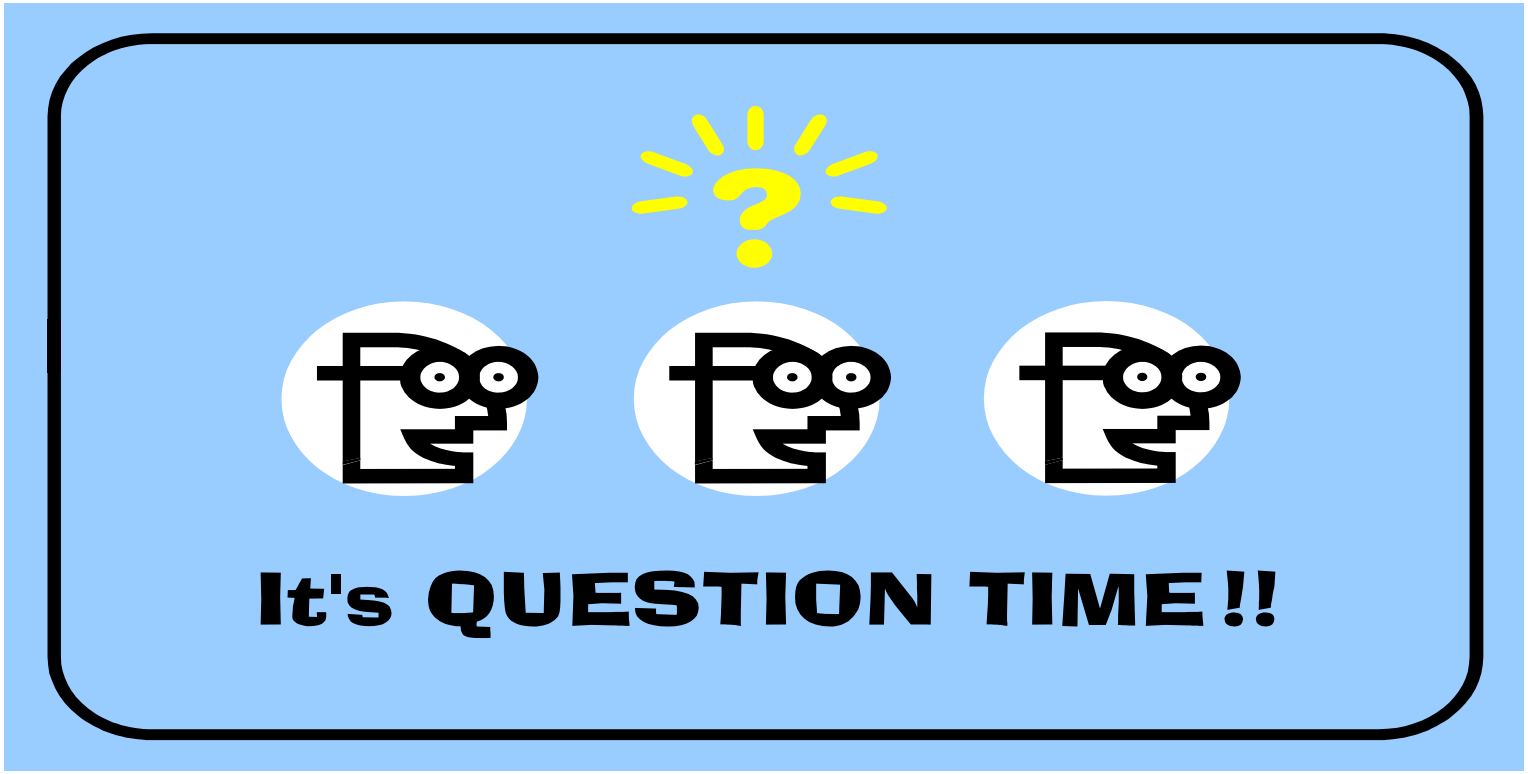
# CE 401 Civil Engineering Seminar QUIZZES:

## Quiz Questions

- **Basis For Questions:**
  - **All in-class discussions, readings, videos, etc. prior to the quiz.**
  - **Emphasis is given to most recent material, but some subjects thread through the semester experience**
- **Questions are Primarily Multiple Choice with some True-False**
  - **Multiple Choice questions: 2 points each**
  - **True-False questions: 1 point each**

# CE 401 Civil Engineering Seminar

## QUIZZES:



# CE 401 Civil Engineering Seminar Discussion Groups:

## Discussion Groups Week 01

Spring 2024 Teams For Section 02 For Week 01 Only

| | | | | |
|---|---|---|---|---|
| A | Allen | Hacker | Neuzel | Wesselman |
| B | Barber | Hite | Pulikowski | Wyckoff |
| C | Berg | Kodura | Riney | |
| D | Campbell | LaPorte | Thompson | |
| E | Chaney | Lambert | Shalash | |
| F | Fulkerson | Meyers | Slugantz | |

- **Need to submit your fixed groups for rest of the semester by email by Monday afternoon.**
- **There will be 5 groups with 3 members**

# CE 401 Civil Engineering Seminar Discussion Groups:

## Permanent Discussion Group Formation Status

**SECTION 2 DISCUSSION GROUPS**

| | 1 | 2 | 3 | 4 | 5 |
|---|---|---|---|---|---|
| A | Allen | Fulkerson | Lambert | Riney | |
| B | | | | | |
| C | | | | | |
| D | | | | | |
| E | | | | | |
| F | | | | | |

**STATUS OF SECTION 2 GROUP FORMATION**

| Groups | Students | Filled | Remaining Groups, Section 2 | |
|---|---|---|---|---|
| 6 | 20 | Groups | 16 | Students |
| 4 | 3 Person Gr | 0 | 4 | 3 Person Groups |
| 2 | 4 Person Gr | 1 | 1 | 4 Person Groups |

**These Tables will populate on the CE-401 Webpage as group formation proceeds**

# CE 401 Civil Engineering Seminar Discussion Group Week 01 Activity:

| Timely Initial Posts: | 85.0% | Current Participation: 1 | | | Last Update | 12-Jan-24 | 6:16 AM |
|---|---|---|---|---|---|---|---|
| Section 2 | | Week 1 | Discussion Question Activity Report | | | | |
| Question | Group | Leader | 1 | 2 | 3 | 4 | 5 |
| 1 | A | Allen | Allen | Hacker | Neuzel | Wesselman | |
| 1 | C | Berg | Berg | Kodura | Riney | | |
| 1 | E | Lambert | Chaney | Lambert | Shalash | | |
| 2 | B | Hite | Barber | Hite | Pulikowski | Wyckoff | |
| 2 | D | Campbell | Campbell | LaPorte | Thompson | | |
| 2 | F | Fulkerson | Fulkerson | Meyers | Slugantz | | |
| 3 | A | Neuzel | Allen | Hacker | Neuzel | Wesselman | |
| 3 | C | Riney | Berg | Kodura | Riney | | |
| 3 | F | Slugantz | Fulkerson | Meyers | Slugantz | | |
| 4 | B | Barber | Barber | Hite | Pulikowski | Wyckoff | |
| 4 | D | Thompson | Campbell | LaPorte | Thompson | | |
| 4 | E | Chaney | Chaney | Lambert | Shalash | | |
| 5 | A | Hacker | Allen | Hacker | Neuzel | Wesselman | |
| 5 | D | LaPorte | Campbell | LaPorte | Thompson | | |
| 5 | F | Meyers | Fulkerson | Meyers | Slugantz | | |
| 6 | B | Pulikowski | Barber | Hite | Pulikowski | Wyckoff | |
| 6 | C | Kodura | Berg | Kodura | Riney | | |
| 6 | E | Shalash | Chaney | Lambert | Shalash | | |

Font Legend

| | | | |
|---|---|---|---|
| non-bold | No post made, time for posting remains | non-bold | Late Post before consensus, 20% loss |
| **Bold / *Bold*** | **Post made within Time** | **Bold** | **Post is made after consensus, 60% loss** |
| Non-Bold Leader-No Consensus Posted, -5 Points | | *Ital. non-bold* | *No Post Made, 100% loss* |

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# CE 401 Civil Engineering Seminar Discussion Group Week 01 Activity:

## Discussion Question Activities Week 01

- **For the most part, this week was a good start with the discussion questions**
- **Some student responses did not seem to address the question I asked. Be sure to answer the specific question I am asking**
- **A few student responses indicate a lack of reading or reading comprehension.**
  - **If you need clarification about the readings or videos, email your questions to me.**
  - **Your attempts to answer these questions without reading or without comprehending are obvious.**

# CE 401 Civil Engineering Seminar Discussion Group Week 01 Activity:

## Discussion Question Activities Week 01

- **This Semester's participation rates for initial posting by the Wednesday deadline and initial posting at any time was consistent with historical data for first week activities.**
- **Participation rates moving forward need to increase as they have in the past.**

| | WEEK 01 PARTICIPATION RATES | | | | WEEK 02 PARTICIPATION RATES | | | |
|---|---|---|---|---|---|---|---|---|
| | Week-Sect Initial Posts By Wed noon | 1-1 Posts Any Time | Week-Sect Initial Posts By Wed noon | 1-2 Posts Any Time | Week-Sect Initial Posts By Wed noon | 2-1 Posts Any Time | Week-Sect Initial Posts By Wed noon | 2-2 Posts Any Time |
| Spring 24 | 58.8% | 100.0% | 85.0% | 100.0% | | | | |
| Fall 23 | 42.9% | 85.7% | 25.0% | 96.7% | 87.5% | 100.0% | 93.3% | 100.0% |
| Spring 23 | 47.2% | 100.0% | 65.0% | 100.0% | 98.6% | 100.0% | 93.8% | 97.5% |
| Fall 22 | 52.2% | 91.3% | 65.0% | 100.0% | 87.0% | 100.0% | 100.0% | 100.0% |
| Spring 22 | 50.8% | 90.5% | 65.3% | 93.1% | 85.7% | 100.0% | 95.8% | 100.0% |
| Fall 21 | 42.2% | 95.6% | 47.8% | 89.9% | 93.3% | 100.0% | 100.0% | 100.0% |
| Spring 21 | 27.8% | 77.8% | 53.0% | 95.5% | 94.4% | 100.0% | 100.0% | 100.0% |
| Fall 20 | 64.7% | 100.0% | 45.5% | 100.0% | 90.9% | 100.0% | 98.3% | 100.0% |
| Avg. Prior 3 Years | 43.8% | 90.1% | 53.5% | 95.8% | 91.1% | 100.0% | 97.2% | 99.6% |
| | This Semester | | Prior 3 Years | | This Semester | | Prior 3 Years | |
| Combined Sections | 77.5% | 100.0% | 52.1% | 94.5% | | | 95.1% | 99.8% |

# CE 401 Civil Engineering Seminar
## Basic Definitions

**When I write and talk about design professionals, and design professional firms, what services (type of work) do design professionals and design professional firms perform and for whom?**

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**This is a different activity than building projects for owners.**

# CE 401 Civil Engineering Seminar
## Basic Definitions

**When I write and talk about design professionals, and design professional firms, what services (type of work) do design professionals and design professional firms perform and for whom?**

**They design projects for clients.**

**This is a different activity than building projects for owners.**

**The construction industry has owners, designers, and builders. Our focus this semester will be on the designers, but we will talk about all three.**

# CE 401 Civil Engineering Seminar Discussion Questions:

## Discussion Question 1

**Ernest Greenwood wrote over 60 years ago that a profession is distinguished from non-professional occupations by five attributes, all of which exist within the professions while non-professional occupations may satisfy some, but not all of these professional attributes. Society grants Professional Status to a certain few occupations to protect important public interests; however, society does NOT grant professional status to most occupations because of the absence of these important public interests. The Professional Status provides a profession with certain market protections that are tantamount to a government-sanctioned monopoly in exchange for the profession's commitment to protecting these important public interests because the government cannot protect those public interests without the profession's commitment to do so. These public interest protections in exchange for market protections form a social contract between a profession and society.**

**a) What is the primary protection that this social contract between the Public and the Engineering Profession provides the public in exchange for its government-sanctioned monopoly?**

**b) How does the engineering profession assure the public that the profession and its members will protect these public interests?**

**b) Identify at least 3 reasons why non-professional occupations seek this government-sanctioned Professional Status.**

| | |
|---|---|
| A | Allen |
| C | Berg |
| E | Lambert |

# CE 401 Civil Engineering Seminar Discussion Questions:

**Discussion Question 1**

**a) What is the primary protection that this social contract between the Public and the Engineering Profession provides the public in exchange for its government sanctioned monopoly?**

**Profession promises that it will protect public health, safety and welfare above all other concerns, AND in exchange,**

**The Government authorizes the Profession**

**-to self regulate, e.g., determine requirements for membership including education, training, apprenticeship, conduct, and**

**-to prohibit non-members from competing with members.**

**This is tantamount to a government sanctioned monopoly**

**b) How does the engineering profession assure the public regarding these public interests?**

**The primary precept of the profession's code of ethics requires each member of the profession to protect the public health, safety and welfare above all other concerns, including personal gain and profit.**

# CE 401 Civil Engineering Seminar Discussion Questions:

**Discussion Question 1**

**c) Identify at least 3 reasons why non-professional occupations seek this government sanctioned Professional Status.**

1) **To increase income (compensation)**
2) **To gain prestige and recognition**
3) **To restrict competition**

# CE 401 Civil Engineering Seminar Discussion Questions:

**Discussion Question 2**

ASCE's Aspirational vision says that the Civil Engineering profession and Civil Engineers should be in a leadership role in the public debate on environmental policy and infrastructure policy.

**a) Explain in 2 to 3 sentences why ASCE has adopted this aspirational vision of the leadership role that the Civil Engineering Profession should hold in the nation's public policy debates on the environment and infrastructure.**

**b) Explain in 2 or 3 sentences why you either agree or disagree with ASCE's vision that the Civil Engineering Profession should have in the U. S. public policy debates on the environment and infrastructure.**

**c) Based on recent infrastructure report cards, explain whether ASCE's vision is an aspirational call for change or a call for the continuation of the status quo with regard to the role the Civil Engineering Profession has had in the public policy debate on the environment and infrastructure over the last 2 decades.**

| | |
|---|---|
| B | Hite |
| D | Campbell |
| F | Fulkerson |

# CE 401 Civil Engineering Seminar Discussion Questions:

## ASCE Updated Its Report Card in 2021

**COMPARISON OF ASCE INFRASTRUCTURE GRADES**
**2021 From 2017**

| INFRASTRUCTURE CATEGORIES | 2021 GRADE | 1.53 D+ to C- | 2017 GRADE | 1.46 D+ to C- | CHANGE 2017-21 |
|---|---|---|---|---|---|
| Aviation | D+ | 1.33 | D | 1.00 | 0.33 |
| Bridges | C | 2.00 | C+ | 2.33 | -0.33 |
| Dams | D | 1.00 | D | 1.00 | 0.00 |
| Drinking Water | C- | 1.67 | D | 1.00 | 0.67 |
| Energy | C- | 1.67 | D+ | 1.33 | 0.34 |
| Hazardous Waste | D+ | 1.33 | D+ | 1.33 | 0.00 |
| Inland Waterways | D+ | 1.33 | D | 1.00 | 0.33 |
| Levees | D | 1.00 | D | 1.00 | 0.00 |
| Ports | B- | 2.67 | C+ | 2.33 | 0.34 |
| Public Parks | D+ | 1.33 | D+ | 1.33 | 0.00 |
| Rail | B | 3.00 | B | 3.00 | 0.00 |
| Roads | D | 1.00 | D | 1.00 | 0.00 |
| Schools | D+ | 1.33 | D+ | 1.33 | 0.00 |
| Solid Waste | C+ | 2.33 | C+ | 2.33 | 0.00 |
| Stormwater | D | 1.00 | | | |
| Transit | D- | 0.67 | D- | 0.67 | 0.00 |
| Wastewater | D+ | 1.33 | D+ | 1.33 | 0.00 |

# CE 401 Civil Engineering Seminar
# Introduction & Incident At Morales

**Discussion Question 3**

**Some engineers have noted that they can work "fast, good and cheap" and their "clients can pick any two". This assertion stands for the proposition that engineers cannot simultaneously excel in all 3 attributes, e.g.:**

**Engineers can work fast and good, but the work won't be cheap;**

**Engineers can work fast and cheap, but the work won't be good; or**

**Engineers can work good and cheap, but the work won't be delivered fast.**

**a) Define the terms "fast," "good," and "cheap" when used in the context of an engineer's proposal for engineering design services submitted to a client. For example, your response should take the form: "A client will conclude your design will be completed "Fast (or Good or Cheap)" if the proposal promises [BLANK]" (Fill in the BLANK to complete each of the 3 definitions)**

**b) Is the assertion that engineers cannot work "fast, good and cheap" simultaneously right or wrong?**

| | |
|---|---|
| A | Neuzel |
| C | Riney |
| F | Slugantz |

**c) In 2 or 3 sentences, explain the basis for your conclusion in b).**

# CE 401 Civil Engineering Seminar Discussion Questions:

## Discussion Question 3

**Some engineers have noted that they work "fast, good and cheap" and their "client may choose any two". This assertion means engineers can work fast and good, but not cheap, fast and cheap, but not good, or good and cheap, but not fast, but it also means engineers cannot achieve all 3 attributes in their work simultaneously.**

**Is the assertion that engineers cannot work "fast, good and cheap" simultaneously either right or wrong, and in 2 or 3 sentences, explain why?**

1. **A client will conclude your design will be completed "Fast" if the proposal promises to complete the design much quicker than usually required for the client's type of project**
2. **A client will conclude your design will be completed "Good" if the proposal promises to provide high quality design that will result in lower construction and life cycle costs than usually experienced for the client's type of project**
3. **A client will conclude your design will be completed "Cheap" if the proposal promises to perform the design for a fee that is significantly lower than the fee usually required to design the client's type of project.**

# CE 401 Civil Engineering Seminar Discussion Questions:

## Discussion Question 3

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**Is the assertion that engineers cannot work "fast, good and cheap" simultaneously either right or wrong, and in 2 or 3 sentences, explain why?**

1. **What is the most important component required to give clients high quality (work good) in engineering design?**

# CE 401 Civil Engineering Seminar Discussion Questions:

## Discussion Question 3

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**Is the assertion that engineers cannot work "fast, good and cheap" simultaneously either right or wrong, and in 2 or 3 sentences, explain why?**

1. What is the most important component required to give clients high quality (work good) in engineering design? **Experienced, talented engineers!**
2. **Since an engineering company spends more for labor than all other expenses added together, what is the most effective way for that company to provide services at a low cost (work cheap)?**

# CE 401 Civil Engineering Seminar Discussion Questions:

## Discussion Question 3

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**Is the assertion that engineers cannot work "fast, good and cheap" simultaneously either right or wrong, and in 2 or 3 sentences, explain why?**

1. What is the most important component required to give clients high quality (work good) in engineering design? **Experienced, talented engineers!**
2. Since an engineering company spends more for labor than all other expenses added together, what is the most effective way for that company to provide services at a low cost (work cheap)? **Cheap Labor**
3. **How does working fast, i.e., to finish a final design in 5 weeks instead of the usual 5 months (work fast) affect the company's operating cost and work quality?**

# CE 401 Civil Engineering Seminar Discussion Questions:

## Discussion Question 3

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**Is the assertion that engineers cannot work "fast, good and cheap" simultaneously either right or wrong, and in 2 or 3 sentences, explain why?**

1. What is the most important component required to give clients high quality (work good) in engineering design? **Experienced, talented engineers!**
2. Since an engineering company spends more for labor than all other expenses added together, what is the most effective way for that company to provide services at a low cost (work cheap)? **Cheap Labor**
3. How does working fast, i.e., to finish a final design in 5 weeks instead of the usual 5 months (work fast) affect the company's operating cost and work quality? **Cost tend to rise, and quality tends to fall.**

# CE 401 Civil Engineering Seminar Discussion Questions:

**Discussion Question 4**

Mark Zweig observes, "The only strategy that really makes sense for a professional services firm is one of high quality and high price." Zweig then concludes that "Engineering firms that are trying to be the lowest-cost providers in the market sectors are destined for failure."

a) In the first statement, do you believe that Zweig is asserting that a professional services firm that strives to be a "low cost" provider in the market sectors cannot maintain "high quality"? Explain the basis for your response in 2 to 3 sentences.

b) Do you believe an engineering firm can routinely deliver the highest quality services for the lowest cost in the market sectors? In 2 to 3 sentences, explain why you reached this conclusion. (Routinely means consistently doing so in the usual course of business rather than merely possible under certain limited circumstances.)

c) With respect to Zweig's second statement, define what you think Zweig means by "failure" and explain whether and why you agree with Zweig that an engineering firm that strives to be the "lowest cost" provider in the market sectors is destined for failure.

| | |
|---|---|
| B | Barber |
| **D** | **Thompson** |
| **E** | **Chaney** |

# CE 401 Civil Engineering Seminar
# Discussion Questions:

## Discussion Question 4

**Are the answers to part a and b the same for all professional services, whether engineering, architecture, medicine, law, nursing, … , and why?**

# CE 401 Civil Engineering Seminar Discussion Questions:

## Discussion Question 4

**Mark Zweig observes, 'The only strategy that really makes sense for a professional services firm is one of high quality and high price. … Firms that are trying to be the lowest-cost providers in the market sectors are destined for failure.' In 2 or 3 sentences, why is Zweig right or wrong that 'lowest cost' and 'high quality' are incompatible.**

**3. Consider an engineering company with 10 total employees and costs on $2,000,000 Gross Revenue.**

| | | |
|---|---|---|
| ***Payroll (including all payroll burden cost):*** | | ***$1,000,000*** |
| ***Insurance (Facilities, CGL, PLI, Key Man, Autos):*** | ***$240,000*** | |
| ***Supplies (Office and Field):*** | ***$160,000*** | |
| ***Facilities (Rent, Utilities, Repair/Maintenance):*** | ***$120,000*** | |
| ***Equipment (Purchase, Repair/Maintenance):*** | ***$100,000*** | |
| ***Training and Recruiting:*** | ***$50,000*** | |
| ***Business Development, Marketing:*** | ***$30,000*** | |
| ***Project Direct Costs (travel, equipment, etc.):*** | ***$100,000 to $200,000*** | |
| ***Profit (Is Not A Dirty Word):*** | ***$100,000 to $200,000*** | |

**To be lowest-cost provider, it must cut prices to reduce its gross revenue by $200,000 while executing the same amount of work.**

**What is the most effective way for this company to cut its cost to be competitive as the lowest cost engineering company in its market?**

# CE 401 Civil Engineering Seminar Discussion Questions:

## Discussion Question 4

**Mark Zweig observes, 'The only strategy that really makes sense for a professional services firm is one of high quality and high price. … Firms that are trying to be the lowest-cost providers in the market sectors are destined for failure.' In 2 or 3 sentences, why is Zweig right or wrong that 'lowest cost' and 'high quality' are incompatible.**

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| ***Training and Recruiting:*** | ***$50,000*** | |
| ***Business Development, Marketing:*** | ***$30,000*** | |
| ***Project Direct Costs (travel, equipment, etc.):*** | ***$200,000 to $100,000*** | |
| ***Profit (Is Not A Dirty Word):*** | ***$100,000 to $200,000*** | |

**To be highest-cost provider, it must raise its fees to increase its gross revenue by $200,000 while executing the same amount of work.**

**What is the most effective way for this company to use the additional revenue it generates from this fee increase, and why?**

# CE 401 Civil Engineering Seminar Discussion Questions:

**Discussion Question 5**

When a client procures (purchases) design professional services, the client can select the design professional based on the design professional's experience and qualifications (Qualification Based Selection, QBS), or the client can select the design professional based on the fee that the design professional bids to provide the requested scope of services (Competitive Bidding).

a) Which of these two methods (QBS or Competitive Bidding) does the engineering profession support for the procurement of design professional services?

b) Please explain in 2 to 3 sentences why the profession has adopted this position.

c) Rank each of the following types of clients, on a sliding scale of 1 (Absolutely Uses Competitive Bidding) to 10 (Absolutely Uses QBS), regarding the likelihood that the client will procure engineering services using either Competitive Bidding or QBS, and for each situation, explain your ranking in 1 to 2 sentences each.

1. A national, publicly traded business, with facilities at many locations, needs design professional services to design a new facility in Kentucky.
2. The Kentucky Transportation Cabinet needs design professional services to design a new highway in Kentucky
3. A locally owned private business owner, with one business facility located in his Kentucky hometown, needs design professional services to design a new facility to replace the existing facility in the same Kentucky town.

| | |
|---|---|
| **A** | **Hacker** |
| **D** | **LaPorte** |
| **F** | **Meyers** |

# CE 401 Civil Engineering Seminar Discussion Questions:

**Discussion Question 5**

1. **What does QBS stand for and whose interest does QBS protect?**
2. **With QBS, who determines what defines the "most qualified" engineer during the selection process?**

# CE 401 Civil Engineering Seminar
# Discussion Questions:

## Discussion Question 5

**When a client hires an engineer to perform services, the client can do so based on the experience and qualifications of the engineers he considers (Qualification Based Selection, QBS), or the client can do so based on the fee these engineers charge for their services (Competitive Bidding).**

**Which type of client is most likely, more likely, and least likely to use QBS to hire a design professionals, and why?**

| Client Type | Least | More | Most |
|---|---|---|---|
| Sophisticated Private Sector Owners | ___ | ___ | ___ |
| Unsophisticated Private Sector Owners | ___ | ___ | ___ |
| A Governmental Agency | ___ | ___ | ___ |

# CE 401 Civil Engineering Seminar
# Discussion Questions:

## Discussion Question 5

**When a client hires an engineer to perform services, the client can do so based on the experience and qualifications of the engineers he considers (Qualification Based Selection, QBS), or the client can do so based on the fee these engineers charge for their services (Competitive Bidding).**

**Which type of client is most likely, more likely, and least likely to use QBS to hire a design professionals, and why?**

| Client Type | Least | More | Most |
|---|---|---|---|
| Sophisticated Private Sector Owners | ___ | X | ___ |
| Unsophisticated Private Sector Owners | X | ___ | ___ |
| A Governmental Agency | ___ | ___ | X |

# CE 401 Civil Engineering Seminar Discussion Questions:

**Discussion Question 6**

Competitive Bidding vs. Qualification Based Selection.

The Federal Government adopted the Brooks Act (PL 92-582) which says, "The Congress hereby declares it to be the policy of the Federal Government to publicly announce all requirements for architectural and engineering services, and to negotiate contracts for architectural and engineering services on the basis of demonstrated competence and qualification for the type of professional services required and at fair and reasonable prices." A majority of the states have adopted state versions of the Brooks Act. In contrast, the government almost always uses competitive bidding to hire its construction contractors.

a) Which factor, Fee or Qualifications, will be most important to the purchaser when the purchaser:

Uses QBS to select the provider?

Uses Competitive bidding to select the provider?

b) When a client procures design professional services using QBS, explain in 2 or 3 sentences the role that the design professional's fee plays in the QBS process.

c) When a client procures design professional services using competitive bidding, explain in 2 or 3 sentences the role that the design professional's qualifications play in the competitive bidding process.

d) In 3 to 4 sentences, please identify the differences between design professional services and construction services that explain why the government has a policy that mandates QBS to purchase design professional services, but the government uses competitive bidding to purchase construction services.

| | |
|---|---|
| **B** | **Pulikowski** |
| **C** | **Kodura** |
| **E** | **Shalash** |

# CE 401 Civil Engineering Seminar Discussion Questions:

**Discussion Question 6**

**d) In 3 to 4 sentences, please identify the differences between design professional services and construction services that explain why the government has a policy that mandates QBS to purchase design professional services, but the government uses competitive bidding to purchase construction services.**

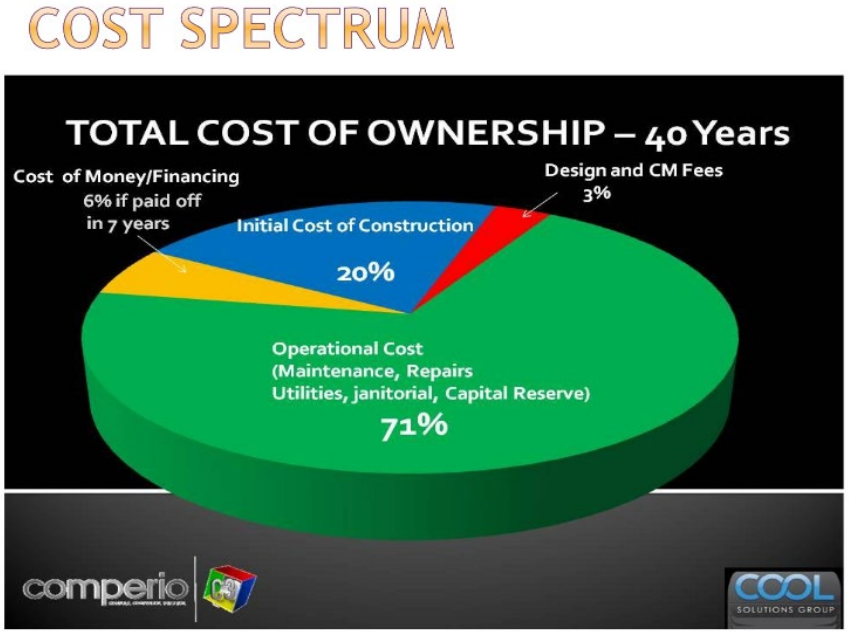
- **Obvious Reason: Federal statutes mandate QBS for A/E services but not for construction work, but the question really is, why is this the law?**
- **Real Reason:**
  - **Federal statutes mandate QBS for A/E services because the quality of the A/E services has great impact on construction and life cycle costs, and QBS forces the Federal Government to focus first on quality factors in selecting the A/E and before negotiating the detailed scope, deliverables, schedule, and fee.**
  - **Federal Statutes do not mandate QBS for Construction work because the construction work must be accomplished in accordance with plans and specifications prepared during design, and the contractor who offers to complete the specified work for the least cost is the Government's best choice.**

**Why does the government mandate the use of QBS to hire A/E firms but not to hire law firms or other professional contractors?**

# CE 401 Civil Engineering Seminar Discussion Question 6:

**Expressed As % of Construction Cost:**

| | |
|---|---|
| **Design:** | **6%** |
| **CM:** | **9%** |
| **Construction:** | **100%** |
| **Financing:** | **30%** |
| **O&M:** | **355%** |




ttp://www.buildersassociation.com/docs/Education/Estimating%20Academy/Mark%20Gardner%20Total%20Cost%20of%20Ownership.pdf

# CE 401 Civil Engineering Seminar
# Discussion Question 6:

**Consider a $3,000,000 project**
**Assume the owner asks Engineers A and B**
**for Proposals With the following Fee Proposals**
**Assume Construction, Financing and O&M Costs**
**Are Otherwise the Same**

| Function | Engineer A, 5% | Engineer B, 7% | $ Difference | % Difference |
|---|---|---|---|---|
| Design Fee | $150,000 | $210,000 | $60,000 | 40.0% |
| Construction, CM, and Financing Cost | $4,170,000 | $4,170,000 | $0 | 0.0% |
| O&M Costs | $10,650,000 | $10,650,000 | $0 | 0.0% |
| Total Life Cycle Costs | $14,970,000 | $15,030,000 | $60,000 | 0.4% |

**How does the Owner Evaluate These Engineers?**

# CE 401 Civil Engineering Seminar Discussion Questions:

## Discussion Question #6

If a client uses QBS, can the client consider fee before hiring the engineer, and in 2 to 3 sentences, explain why?

If a client uses competitive bidding, can the client consider experience and qualifications before hiring the engineer, and in 2 to 3 sentences, explain why?

1. **(a) You are the owner who needs to hire an engineering company to design your project. Engineer A will design your project for 5% of construction cost, and Engineer B will design your project for 7% of construction cost. How will these fee factors affect your decision?**

# CE 401 Civil Engineering Seminar Discussion Questions:

## Discussion Question #6

If a client uses QBS, can the client consider fee before hiring the engineer, and in 2 to 3 sentences, explain why?
If a client uses competitive bidding, can the client consider experience and qualifications before hiring the engineer, and in 2 to 3 sentences, explain why?

1. **(b) You are the owner who needs to hire an engineering company to design your project. Engineer X has never completed a similar project and Engineer Z has successfully completed several similar projects. How will these experience factors affect your decision?**

# CE 401 Civil Engineering Seminar Discussion Questions:

**Discussion Question #6**

If a client uses QBS, can the client consider fee before hiring the engineer, and in 2 to 3 sentences, explain why?

If a client uses competitive bidding, can the client consider experience and qualifications before hiring the engineer, and in 2 to 3 sentences, explain why?

1. **(c) You are the owner who needs to hire an engineering company to design your project. Engineer M has never completed a similar project and requests a fee of 5% of construction cost. Engineer P has successfully completed several similar projects and requests a fee of 7% of construction costs. How will you balance the fee and experience factors in making your decision?**

# CE 401 Civil Engineering Seminar Discussion Questions:

**Discussion Question #6**

If a client uses QBS, can the client consider fee before hiring the engineer, and in 2 to 3 sentences, explain why?

If a client uses competitive bidding, can the client consider experience and qualifications before hiring the engineer, and in 2 to 3 sentences, explain why?

1. **(c) You are the owner who needs to hire an engineering company to design your project. Engineer M has never completed a similar project and requests a fee of 5% of construction cost. Engineer P has successfully completed several similar projects and requests a fee of 7% of construction costs. How will you balance the fee and experience factors in making your decision?**
2. **How does an engineer's experience with a type of project affect construction and life cycle costs for the project?**

# CE 401 Civil Engineering Seminar Discussion Questions:

**Discussion Question #6**

If a client uses QBS, can the client consider fee before hiring the engineer, and in 2 to 3 sentences, explain why?

If a client uses competitive bidding, can the client consider experience and qualifications before hiring the engineer, and in 2 to 3 sentences, explain why?

1. **(c) You are the owner who needs to hire an engineering company to design your project. Engineer M has never completed a similar project and requests a fee of 5% of construction cost. Engineer P has successfully completed several similar projects and requests a fee of 7% of construction costs. How will you balance the fee and experience factors in making your decision?**
2. **How does an engineer's experience with a type of project affect construction and life cycle costs for the project?**
3. **If Design costs 5% to 7% of construction cost, and life cycle costs (operation and maintenance) are 3 to 4 times construction cost, how does an owner decide which engineer's design proposal will be least expensive?** *Note: At the extreme, Life Cycle Costs can be as high as 50 times construction costs.*

*See*
***https://www.wbdg.org/resources/life-cycle-cost-analysis-lcca***

# CE 401 Civil Engineering Seminar
# Discussion Question 6:

## Let's add:

**Engineer B is more experienced that Engineer A with the specific type of project planned by this owner, and Engineer B's experience can produce a more efficient design.**

**How much do you think a more efficient design can reduce the owner's Construction Cost?**

**1%  3%  5%  10%**

# CE 401 Civil Engineering Seminar
# Discussion Question 6:

## How Does The Picture Change, if Engineer B's Design Will reduce Construction Cost?

Assume Engineer B's Design Reduces Constuction Cost 3.0%

## The Fees for Engineers A and B As well as Financing and O&M Costs Are Otherwise the Same

| Function | Engineer A, 5% | Engineer B, 7% | $ Difference | % Difference |
|---|---|---|---|---|
| Design Fee | $150,000 | $210,000 | $60,000 | 40.0% |
| Construction, CM, and Financing Cost | $4,170,000 | $4,044,900 | -$125,100 | -3.0% |
| O&M Costs | $10,650,000 | $10,650,000 | $0 | 0.0% |
| Total Life Cycle Costs | $14,970,000 | $14,904,900 | -$65,100 | -0.4% |

**Should This Impact The Owner's Evaluation of Engineer's A and B?**

# CE 401 Civil Engineering Seminar
# Discussion Question 6:

## Let's add:

**Engineer B is more experienced that Engineer A with the specific type of project planned by this owner, and Engineer B's experience can produce a more efficient design.**

**How much do you think a more efficient design can reduce the owner's O&M Cost?**

**1%  3%  5%  10%**

# CE 401 Civil Engineering Seminar
# Discussion Question 6:

## How Does The Picture Change, if Engineer B's Design Will reduce O&M Cost?

| Assume Engineer B's Design Reduces O&M Cost | 3.0% |
|---|---|

## The Fees for Engineers A and B As well as Financing Costs Are Otherwise the Same

| Function | Engineer A, 5% | Engineer B, 7% | $ Difference | % Difference |
|---|---|---|---|---|
| Design Fee | $150,000 | $210,000 | $60,000 | 40.0% |
| Construction, CM, and Financing Cost | $4,170,000 | $4,044,900 | -$125,100 | -3.0% |
| O&M Costs | $10,650,000 | $10,330,500 | -$319,500 | -3.0% |
| Total Life Cycle Costs | $14,970,000 | $14,585,400 | -$384,600 | -2.6% |

**Should This Impact The Owner's Evaluation of Engineer's A and B?**

# CE 401 Civil Engineering Seminar Discussion Questions:

**Discussion Question #6**

- **QBS protects the financial interests of the owner by allowing the owner to focus first on the experience and qualifications of the potential designers before considering the design professionals' fees.**
- **Quality during design usually translates into lower construction and life cycle costs.**
- **The design cost is highly leveraged against construction and life cycle costs, which minimizes the significance of most if not all design fee differences.**
- **Therefore, engineers should emphasize during selection process how their clients saved money on their projects due to designs that reduced construction and life cycle costs.**

# CE 401 Civil Engineering Seminar
# Question Time: