



## Panel 1C Capstone 101

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**Panelists:**

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**Description:** This panel is targeted for new instructors, those developing new programs, and anyone who would like to benefit from the shared wisdom of veteran instructors. Learn about best practices from people who have been there.

**Notes:**

Capstone 101 discussion leading questions:

1. [BN] Why have a capstone class or sequence?
2. [BN] Where do you find good projects for capstone?
  - a. BE - have a sales person, does some himself but mainly the sales person
  - b. BN - recruits himself, has a lot of repeat customers
  - c. Plant seeds with alumni. Play the long game
  - d. BE - also push on alums - gets Alumni Relations
  - e. Work with Development team
3. [BN] How do you define success in capstone design?
  - a. BN - Communication
  - b. BD - Try to balance successful outcome and learning
    - i. Students learned something and enjoyed it, clients coming back
  - c. BE - Learn why and can explain it
  - d. Leo - UM - Learn the design process
4. [BN] What is the role of capstone design in the engineering curriculum?
  - a. How can curriculum gaps/weak points identified in capstone be fed back into curricular design?
5. [BD] How do you assign teams?
  - a. TP - we let the students bid and then er form the teams
6. [BD] How do you balance giving the students structure and allowing them freedom to make their own decisions?
7. Frequency and types of assessment/ expectations? Too much vs too little.

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- a. BN - Assessment is important
  - i. Evaluation at every step of the design process; share the rubrik
  - ii. Does it at both the individual level and the team level; eg, they do individual concept generation, then team individual
- b. BE - Does not share the rubrik so they don't just check the box
- c. TP - if they check the boxes, they get a B; have list of extra items they need to do for the A
- d. Peer evaluation?
  - i. BE - students can take it better if they know you care;
  - ii. BD - incorporate reflections that include a) what you said you would do, b) what you did, c) what you learned from the difference. This is then shared within the team - if someone is not on track or contributing fairly, then need to talk with them about what grade they want and how much they need to get there.
    - 1. These are the 'phase plans'. 3 parts to their grade from this: deliverables, contribution, and (?)
  - iii. BN - detailed, 4 page eval at end of first semester
  - iv. BE - CATME online tool through Purdue
    - 1. ? - do the CATME every month; extra points if their self assessment is close to their teammates evaluations
    - 2. Use it to scale the team grade; anything below 0.8 the student needs to come talk with them
  - v. Most people do them multiple times a semester
    - 1. BD - having the conversation about potential red flags earlier is easy
  - vi. Also assessing quality of feedback - provide students with examples of good feedback; what can this person improve on and what do they do well?
    - 1. For areas to improve on - not just pointing out errors in the past, but specific actions they can take/achieve
  - vii. ? from Texas State (?) - have their second semester students provide design review feedback to the first semester students
  - viii. Should the students' comments be anonymous?
  - ix. Critique, not criticism → formative
- e. Team charters?

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- i. Most important just in the drafting/discussion - what are peoples expectations for the class and what you want out of it?
8. [BD] For large programs, how do you handle communication with your students?
9. [BE] How do you assess and evaluate beyond the team, for individual contributions?
10. [BE] How do you handle situations where a student is falling short of teammates' expectations?
11. [BE] For a two-course sequence, what do you do if a team or its project is falling short after course 1?
12. [TP] Top Tip?
  - a. Bill: Model the communication you want them to learn - balancing concise and detailed, formal and informal, modes, etc
  - b. Beth: Be ok with ambiguity; it won't be perfect, that's ok, learn as you go and continuously improve
  - c. Bahram: create structure but be flexible
  - d. LM from Clemson: intentionally put ambiguity in there - not all the information they need.
13. How to handle unequal contributions?
  - a. Individual contribution factors into deliverables grade
  - b. Mix of individual and team assessments/evaluations
  - c. CATME team avg
14. I teach a 4 credit hour capstone course...what is the minimum number of hours that students should be expected to work on their project each week? Are there consequences for not meeting this minimum?
15. When we are ready to move on from peer evaluation discussion.... I would love to hear about how panelists consider best use of class time.
16. BE - more focus on coaching and professional skills
  - a. Brings in many guest speakers  
BD - Flipped class - online learning modules
  - b. BN - Cover eng topics that aren't covered in the first three years
  - c. Most here do prof. Skills, etc.
17. How to handle projects where the timing doesn't line up well with scheduled PDR/CDR presentations?
  - a.
18. Use of mentors/advisors for teams?
  - a. BE - considers them a team - they meet every 2 weeks
  - b. BN - Mostly industry sponsored - they supply a mentor/advisor



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- i. Varied success
  - ii. Set expectation of capstone, not internship
  - iii. Sometimes a PhD student w/ previous industry experience can be a good mentor
- c. TP - outside consultants mentor teams; get paid, \$1.5k/semester → \$3k/project
  - d. BD - bring in mentors as adjunct, generally retired engineers, full teaching load is 3 teams per semester ?
  - e. BE - paid - 4 teams over the whole year is one course equivalent
19. Providing formative feedback on regular reports, balancing time and use of teaching assistants, etc.
20. How do you recommend handling team leaders? Let them form naturally? Encourage them to formally pick one but not require it? Have them apply to be leader? Assign one?