Dept. Civil & Urban Engineering

Course Outline CE-GY 8253 or MG-GY 8253

Project Management for Construction

Spring 2018

Pooyan Aslani, Ph.D., PE.

Thursday @ 1800 to 2030;

A Civil Engineering platform for project management (CEPM)

To contact professor: PASALNI@NYU.edu,
Phone: 212-545-9320
Office hours: by prearranged appointment only

Course Pre-requisites: None

Course Description:

Historical Context: The challenge for civil engineers practicing as program and project managers is that each may possess an inherent complexity and pace that may at times exceed our ability to manage them. The very essence of our profession is that the confidence stakeholders put in civil engineers to manage these programs and projects will never be betrayed.

The future vision of civil engineering practice as a platform for project management can only be accomplished in an environment where processes are defined, documented and monitored.

This vision also requires these processes to be tailored or adapted for project specific requirements and continuously improved in a value-added way throughout the project life-cycle or duration.
Lastly, it also requires characterizing and describing "uncertainties" in terms of variations in process, gaps in project data, limits to engineering knowledge and models, and finally stakeholder behavior that puts the project at risk.

The stakeholder expectation is that this disciplined application of specialized civil engineering knowledge and practices will result in;

- Development and implementation of engineering tools, solution sets, etc. that represent the best trade-offs between costs and benefits in order to successfully deliver the desired strategic outcomes,
- Executing at all layers (work package, project and program) to meet objectives and fulfill requirements for the project in a predictable and reliable manner that meets or exceeds acceptance criteria.

Only a formal, process-based approach to civil engineering and its specializations – design management, construction management and project management – will deliver this result!

Civil Engineering is the profession in which a knowledge of the mathematical, social and physical sciences gained by study, experience, and practice is applied with judgment and decision-making using policies, plans and processes to develop ways to utilize, economically, the materials and forces of nature to sustainably deliver projects for the progressive well-being of humanity in creating, improving and protecting the environment, in providing facilities for community living, industry and transportation, and in providing structures for the use of humanity in a manner that meets or exceeds stakeholder(s) (as defined) expectations thereby earning social trust and gaining recognition as environmental stewards.

Course Objectives:

Students will learn and have a good understanding of:

1. The value of practicing Civil Engineering in a professional/practice “framework” (ASCE practices or a State PE), the value added by a professional practice of management controls… the future.. PE in PM, Risk Project Controls …
2. The benefit or value added by standardizing project execution/delivery by introducing concepts of project phasing/milestones (Federal Transit Administration’s New Starts program phasing as an example, Project Execution strategy/Solution).. understanding projects, portfolios and programs … developing milestones, phases and criteria (exit and entrance)
3. The benefit of distinguishing between adaptive and predictive development cycles, Iterations vs. increments, or positive versus negative increments? (Lean vs classical PM delivery)
4. The concept of project variables to delivering projects under constraint, the value of breaking the project into scope, cost and schedule components?

5. Concepts of project development versus project definition, Can the CE deliver “design to budget”? Can the CE produce “control solutions” that allow earlier detection of variances from baseline and adequate intervention measures?

6. The benefits of allocating scope and therefore or thereby risk among third parties or the overlapping concepts of project execution and project delivery? (The design build conundrum)
1.0 Course Structure:

Course CE-GY 8253 (“CEPM”) is a graduate civil engineering class in project management for Construction. Instruction for the course is offered on a “condensed schedule”, each class meeting last 150 minutes, net of breaks and is almost the equivalent of a week for a regular undergraduate semester course. This impacts pacing, assignments and attendance.

Successful completion of the CEPM course gives the student 3 “credits” or credit hours. Under Federal guidelines, one credit hour including breaks is 60 minutes of instruction per week and must include a minimum of 50 minutes of instruction at each session - each course session for CEPM is 150 minutes (3x 50 minutes) per week or 45 credit hours (2,250 minutes) of instruction each semester.

**CEPM also requires that for 45 hours of instruction, students should plan to spend at least ninety (90) to as much as one-hundred and twenty hours (120) of work in parallel with the course instruction as detailed in the session plans for reading assignments, student deliverables, etc.**

CEPM is a core course for the [Master of Science in Civil Engineering degree](https://www.nyu.edu/) at NYU | Tandon whether the student chooses a “Single Area of Concentration” or the “General Program”. The course covers …

“topics specific to developing and coordinating large projects, including organizational structures, management functions, pricing and estimating project costs, bidding and contracting, risk allocation, scheduling, time and cost control, labor relations, quality management and project life-cycle activities.”

(NYU Catalog)

1.01 Course Design:

CEPM will focus on teaching policy and practices specific to the delivery of civil infrastructure or “constructed projects” by professional civil engineers in institutional or corporate settings.

**CEPM is intended to generally conform with the recommendations in the ASCE Civil Engineering Body of Knowledge (2nd edition.)**

CEPM as a graduate level course uses a number of the same learning outcomes as the baccalaureate level program such as civil engineering design and project management as well as others, not in the underlying program, in the specialized area of Civil Infrastructure and Project Management such as civil engineering construction, civil engineering communication, process, controls.

CEPM is designed to conform with ABET program accreditation requirements in that it is consistent with the program area (Civil Engineering) delivers instruction and expectations beyond that of the baccalaureate level as noted above and extends that knowledge and skills into specialized engineering practice of Civil Infrastructure and Project Management.
CEPM is not intended to train students for education or research and it is not a capstone course.

1.02 Practice Context for Course:

CEPM is also part of an instructional program that is designed to qualify as the equivalent of one year in acceptable professional practice for licensure. The intent in developing and delivering this CEPM class is that it qualifies as acceptable civil engineering experience and generally meets the requirements individual licensing authorities in the United States subject to local variances. The CEPM class and coursework meets this intent and conforms with requirements in that

1. the education experience is supervised under the direction of qualified engineering instructors who themselves are licensed professional engineers (PEs),
2. the coursework requires the student to develop advanced skills and demonstrate initiative in the application of civil engineering principles as well as the opportunity to exercise sound judgment in reviewing the work of other civil engineers,
3. the experience must be of a sufficiently broad nature,
4. the experience must progress from simple tasks to work of greater complexity with the student exposed to problems of greater interest to society and the engineering community and
5. motivated to further the profession and their professional development. (Source: NSPE)

CEPM is also designed to prepare the student to acquire the knowledge necessary to practice professionally well into their mid-career, roughly ten years of experience. The basis for this determination was ASCE Guidelines for Engineering Grades. The dimensions of this experience for ASCE are General Characteristics, Technical responsibilities, Managerial responsibilities, Direction received, Communication Skills and others. CEPM coursework covers parts of the General, Technical, Managerial and Communication subject areas through Engineering Grade V.

1.03 Course Environment and Context:

CEPM envisions civil engineers practicing in an institutional environment where they make or support managers, technical and technical make a variety of program decisions for civil infrastructure programs that are supported by civil engineers performing services, delivering products (“deliverables”) and outcomes that are derived from, based upon or contain:

1. Sufficient, reliable, relevant and useful data and information that meet or exceed standard of care and CEPM requirements for accuracy, completeness, transparency, reliability and cost effectiveness;
2. Information and data are combined from a number of engineering and related disciplines using analytical capabilities and presented within a substantively complete and appropriate engineering or project management context and accessible format (“characterizations”);

3. Analytic elements are adequately quantified, fully integrated, traceable and consistent, compatible with the student’s findings or stated fact and capable of independent analysis or reproduction using disclosed methods and assumptions generating similar analytic results within an acceptable degree of imprecision or error;

4. Material elements of student opinion products are unqualified (or properly qualified), properly structured in terms of analytic and data support.

As in professional practice, deliverables, in this case student deliverables, should be viewed as a form of formal engineering communications.
1.031 Civil Engineering Competency (Mid-Career and Young Professional)

The CEPM course envisions an environment where licensed, mid-career Civil Engineering professionals perform services only in their primary field of practice combined with appropriate training, assistance and counsel from other licensed professionals.

The CEPM context associated with this is that material elements of civil engineering deliverables should be developed by licensed personnel performing services only in areas of their demonstrated competence!

CEPM assumes that such mid-career competence (defined as the ability to execute activities/tasks in an effective and efficient manner.) shall be demonstrated by education or experience in material technical specialization(s) of civil engineering and participation in the execution of the deliverable(s) is restricted to those work elements of the deliverable for which the civil engineering professional is competent and qualified to deliver. Other material elements of such deliverable are performed by qualified associates, consultants, or employees.

The CEPM context associated with this is that in such professional practice licensed civil engineers self-certify their competency and qualifications for delivering products or services.

For the recent graduate or young professional, CEPM assumes that the student is competent for begin professional practice as discussed in Section 4.1. The CEPM course design assumes that the student can master on their own thru self-study and assessment, ALL Bloom Taxonomy level one thru three learning outcomes as outlined in the ABET accreditation materials.

The CEPM context associated with this is that the student is required to develop the same ability for acquiring competency of learning outcomes and self-certification that characterizes professional practice where licensed civil engineers self-certify their competency and qualifications for delivering course products or services.

---


"Inside the IEEE RCD standard ..., the competency term points out the aspects of the competence, skill, attitude, ability (KSA) and includes the learning goals. It is usual to see at competency and competence as synonymous. The definition of competence may include the notions of KSA elements that are related not only to the work activities. In the Bloom Taxonomy, ... the KSA elements are referred to cognitive, affective and psychomotor aspects. In the cognitive domain, learning of mental abilities is the knowledge. In the affective domain, developing emotions is the attitude. In the psychomotor domain, learning is the maturation of manual or physical skill.”
1.032 Professional Practice by Students

In professional practice, “…(a) standard of care is currently the only valid and recognized legal standard used to evaluate the performance of design professionals and evaluate whether professional duties were neglected.”  

An alternative to this is to develop and implement a “standard of professional practice”. (Ibid.) Paraphrasing Williams and Johnson, the purpose of such a standard of professional practice is to reduce failures and related non-acceptances/rework in professional practice that are consequences of management process issues.

“Jack Gillum …, engineer of record for the Kansas City Hyatt Hotel walkway collapse states that, ‘a nationwide standard of practice should be adopted’ in order to ensure that a level of integrity exists regarding design quality and process. “ Williams and Johnson (2013)

Students as young professionals have similar requirements for professional responsibility and ethics. The CEPM framework for competency requires compliance. Just as in professional practice, the CEPM standards for “Professional Practice by Students” for deliverables and services as discussed in Section 1.034 will be used to evaluate whether course requirements have been met.

1.033 Student Certifications

A mid-career civil engineering professional does not warrant or “certify” the perfection of their deliverables any more than …

“(A) physician or surgeon warrants a cure or a lawyer guarantees the winning of a case. All that is expected is the exercise of ordinary skill and care in the light of the current knowledge in these professions. When an … engineer possesses the requisite skill and knowledge common to his profession and exercises that skill and knowledge in a reasonable manner, he has done all that the law requires. He is held to that degree of care and skill and that judgment which is common to the profession.”3

The student as a young professional is only obligated to exercise their skill and knowledge in a responsible manner, common to the profession of civil engineering for their experience.

Therefore, When the student certifies they have completed certain learning outcomes as outlined in Section 4.1, they are certifying their work within the framework of this syllabus and academic standards in an aspirational sense of achieving a higher degree of professional proficiency.

---


3 Bell, George M. "Professional Negligence of Architects and Engineers." Vanderbilt Law Review 12.3 (1959): 711-722
1.034 Acceptance of Student Deliverables:

CEPM intends to simulate the professional practice of civil engineering where deliverables such as the students are often delivered in conformance with formal requirements and inspected using formally established procedures and acceptance criteria (“rubrics”). As in professional practice, the student will self-certify compliance with course requirements such as learning outcomes and deliverable conformance and quality control. Often in practice, these deliverables are produced throughout the engagement and are used to report progress and well as communicate final results. If the delivered products or performed services are in conformance with the applicable requirements for schedule, format, quality and content often termed “quality levels” and documented in the deliverable “rubrics”, they are accepted. In this case, they are graded as “PASS”. Chen of its good to

As in professional practice, requirements for student deliverables may be assigned one of three quality levels: critical, significant, or routine.

1. **Critical Requirements**: Critical requirements are ones that are vital to civil infrastructure and civil engineering functions.
   
   a. In this case, student failure to perform or deliver products meeting CEPM requirements (inclusive of being incomplete or delayed as applicable) is likely in future professional practice to prevent performance of a vital engineering function or substantially reduce the usability, functionality or reliability of the products or services for their intended end purpose. Non-conforming work as defined therein may be rejected as having “Critical non-conformances”.
   
   b. As in professional practice, the Instructors have an interest in knowing with a high degree of confidence that CEPM coursework requirements are performed properly. Therefore, student deliverables will be inspected for coursework compliance from the beginning to the end of the course for all critical requirements either using either self-assessment and certification or instructor directed sampling and assessment.

2. **Significant Requirements**: Significant requirements are requirements other than critical, that if the student were to fail to meet these requirements, it would materially reduce the usability, functionality or reliability of the products or services for their intended end purpose in civil infrastructure and civil engineering functions. Significant requirements are also important and may require intervention during the course by the instructors to demand a higher standard of quality control on the part of the student.

   a. Examples of Significant Requirements with incomplete deliverables may be major nonconforming products or services if they produce assessment, evaluations or data such that the absence of which materially reduces the usability, functionality or reliability of the products or services for their intended end purpose.

   b. Also, Significant Requirements with latent or “hidden” defects may also materially reduce the usability, functionality or reliability of the products or services for their intended end purpose.
3. **Routine Requirements**: Routine requirements account for the majority of student effort. The instructors still expect quality work from the student for these requirements but want to minimize student effort and administrative expenses. The intent is not to channel limited administrative resources into the inspection of routine requirements when the student is competent to be delivering products and services that meet or exceed instructors stated expectations.

   a. Accordingly, instructors will begin the coursework performance period by relying on a lower level of inspection frequency and student self-certification as outlined above. Such monitoring will continue so long as the number of minor nonconformances remains low. Instructors may at their sole discretion, step up quality assurance efforts by conducting a higher frequency and more extensive inspections of student product outputs and services.

   b. Instructors will also examine the student’s work memorandums and quality documentation to determine why the quality level has dropped. Only when instructors regain confidence that the student has corrected their quality problems will the instructors revert to less frequent levels of inspection as its primary means of monitoring this contract performance requirement.

**1.04 Course Type:**

This course will consist of weekly lectures by Dr. Aslani, and visiting Professor O'Connor. Weekly materials including readings and videos will be assigned to students who will be expected to come to class prepared. CEPM is primarily guided discussions/ In-Class exercises / Presentations as discussed in “Typical Class Format” below

**1.05 Background for Undergraduate Education**

The objective of undergraduate civil engineering coursework emphasizes “student teams, active learning exercises, and increased student involvement in engineering design, … (preparing undergraduates for professional practice) … with skills such as teamwork, communication, social awareness, ethics, and business.” This is the basis for the outcomes based accreditation by ABET as part of Engineering Criteria 2000 (EC 2000), for undergraduate engineering education programs. The completion of any accredited undergraduate program such as that offered by NYU completely satisfies the requirement for the successful student to demonstrate their “… readiness to enter professional practice” in civil engineering. (ABET, 2013)

**2 Class Reading Materials:**

**National Academy of Engineering**


**American Society of Civil Engineers (ASCE)**
- The Vision for Civil Engineering in 2025 (2006)
- The Vision for Civil Engineering in 2025: A roadmap for the profession (2009)
- Raise the Bar: Strengthening the Civil Engineering Profession (2013)
- Don't Throw This Away! The Civil Engineering Life.

**Project Management Institute (PMI)**

**RiskEngineering.org**
- Student are to use website materials to supplement class reading as indicated.

Reading materials will also be identified in individual session plans and deliverables.

Instructors may assign other reading materials as well. Appear hath

**3 Required Computer Software:**

No Specialized software is required.
4 Course Requirements:

4.1 Course Assessment Plan:

As discussed above, CEPM is a graduate level course that uses a number of the same learning outcomes as a similar baccalaureate level program such as civil engineering design and project management. It also uses other learning outcomes that are not in a similar underlying program for the specialized area of Civil Infrastructure and Project Management such as civil engineering construction, civil engineering communication, process, controls. The CEPM coursework is also intended to generally conform with the recommendations in the ASCE Civil Engineering Body of Knowledge (2nd edition.).

This means recognizing the crucial role that the Bloom taxonomy plays in that document.

This context of graduate level program creates challenges for the instructional team not only to develop such a class but to deliver meaningful evaluations and assessments. The fundamental premise and accreditation context for any graduate class such as CEPM is that the student is competent for professional practice based upon the underlying accredited baccalaureate level program for the given learning outcomes. This is consistent with the CEPM goal is qualifying as one year of acceptable civil engineering experience as the underlying baccalaureate level program was accredited on the basis of producing graduates competent to begin professional practice.

Part of the process of professional practice is conformance with ASCE’s Guidance for Engineer Interns for the lifelong learning outcome (Outcome 23 in the CEBoK) where ASCE exhorts the young professional to “seek participation in continuing education”.

It is important to note that in professional practice, the nature, depth and frequency of assessment or evaluation for the young professional is profoundly different than in the preceding accredited baccalaureate level program. The young professional often receives unstructured and infrequent assessment with a mix of sources, ranging from mentor and peers to various managers, often in multiple reporting relationships.

While it is not the intent for CEPM to provide such similar assessment, the frequency and depth of the assessment will be very different that received in baccalaureate level programs.

In order to fully understand the assessment structure for a graduate level program class such as CEPM, student must become familiar with CEPM’s overall assessment strategy and its related documentation.

The student must master the learning outcomes outlined for the class and their details laid out in the rubrics in this document.

An essential feature in the organization of those rubrics is Bloom’s taxonomy which “describe these skills using a dual-branched taxonomy represented in figure 1. Each branch represents what we consider a distinct type of skill: (1) understanding general principles (concepts), and (2) the ability
to refine ideas (procedural). Along each branch is a continuum of understanding. An individual's understanding may advance from Knowledge to Evaluation … (using the Bloom Taxonomy). “

4.1.1 Background and Discussion on Baccalaureate Level Evaluation

Since all levels of both branches are essential elements to engineering design, both should be incorporated into the evaluation of engineering students. Traditional tests and assignments for baccalaureate level program outcomes are often restricted to the students' ability to accurately apply principles and theories in clearly posed problems ("application" on the "procedural" branch of the figure). (Everett, et. al.)

![Figure 1. A hybrid taxonomy of engineering skills.](image)

Everett, et. al. developed four independent evaluation instruments for this type of baccalaureate level engineering education namely; RATs (Readiness Assessment Tests), BUnTs (Basic Understanding Tests), MEEs (Major Evening Exams), and MiSTs (Minimum Skills Tests). Everett’s intent was for the BUnTs and MEEs to address students' application, analysis, and synthesis skills on the conceptual branch of (figure 1). The MiSTs were to be used as “a criterion-referenced evaluation of application skills on the procedural branch of (figure 1)”. These encouraged students to stay current with the class. The RATs were used to indicate student’s readiness for lecture. (Everett, 1999)

**RATs (Readiness Assessment Tests)** Everett develops the RATs from preclass reading assignments. In his practice, there were a single set of questions displayed on an overhead projector. Everett’s goal was simply to encourage students to prepare for the class by reading the required or suggested material. The question in designing such tests is are they open book or multiple choice as well as how much time to allocate for this exercise to be reliable.

**BUn Ts (Basic Understanding Tests)** Everett, et. al. constructed these tests such that they require the student to

---

“make connections between theory presented in the course and real world observations … Though no mathematics is required to demonstrate understanding, the governing …. phenomena … (or social context would) … typically elude the casual observer.”

In Everett’s case, these tests were given once per week with a time limit of between 15-30 minutes. Everett’s objective was to motivate students to do more than completing homework assignments and to “…demonstrate the ability to apply basic principles to analyze how things work.” Using the Bloom taxonomy in figure 1, Everett was trying to assess if the student possesses

“….application and analysis abilities of concepts. The student must be able to translate the information in the problem statement as well as extrapolate the facts covered in lectures and reading (both of these abilities are considered comprehension … [in the Bloom Taxonomy]). The student is then expected to analyze and organize governing principles to derive an abstract explanation.”

Everett’s article discusses the difficulty in using these types of assessments, crucially in baccalaureate level programs.

MiSTs (Minimum Skills Tests) Everett, et. al., defined these “selected response tests are the mechanism for the criterion-referenced evaluation of each student's progress.” According to Everett, the MiST consisted of 10 multiple-choice questions.

“The problems originated by simplifying selected problems from the previous week's homework assignment. MiSTs evaluate the student's knowledge of specifics, conventions, and methodology typical in the application of principles and theories. Some problem translation is involved but not to the extent as is required on the MEEs.

Two unique characteristics of the MiSTs are the frequency of evaluation and that they are selected response (multiple choice) tests, which is atypical of engineering classes. The tests were administered weekly over the material covered in that week's lecture and homework assignment. This motivated the students to stay current and it restricted the material on each test to a well-defined domain. As domain-referenced tests, the results should provide conclusive evidence as to whether students have learned specific skills. The multiple-choice format of the test removed all subjective grading, reduced the time required to grade, and established a firm criterion that the students had to achieve.” Everett, 1999

MEEs (Major Evening Exams) Everett notes that MEEs are “summative, constructed response tests.” These are more "traditional" looking exams consisting of 3-4 problems involving "real" systems.

For this type of test Everett states that
“The problem interpretation is intentionally vague to evaluate the student's problem solving ability. After formalizing the problem, the student must usually exercise engineering simplifications to make the problem solvable. These problems exceeded the difficulty of typical homework problems and occasionally did not have single solutions.

... 

The constructs that are measured are application and analysis on the concepts path of figure 1, as well as application, analysis and synthesis on the details path. The instructions to the student included that they should clearly convey a plan with which to solve the problem. Occasionally the problems included an element of design. The student's grade is based on the plan rather than the detailed execution of the plan.”

In their discussion, Everett, et. al. raised several points that are relevant in the context of assessment in the NYU CEPM classes:

1. The first is developing instructor consensus on minimum outcomes to be achieved and the is conveying those same interpretations to the students. The difficulty in achieving the latter is related to the degree to which the outcomes are explicitly articulated in the syllabus and fulfilled in class lectures, etc.

2. Everett noted that Students had difficulty adjusting to the idea that they were not expected to do well on all assessment/test forms. Everett discusses how his instructional team had to reinforce throughout the semester the notion that the MEE and BUnT questions were meant to be tough to resolve and answer. The crucial observation that the Everett instructional team made was that student “interpret tests as obstacles, not opportunities.” Everett, 1999.

3. They viewed the RATs as an effective way to prepare for class. Similarly, they felt strongly about the concept of minimum essential skills but that students rarely understood that minimum really meant minimum. However, dissatisfaction and frustration was high on the MEEs. Most Students didn’t understand that the purpose of the MEE was to distinguish between the C, B, and A students and they believed they deserved more credit than they received.

4. Everett concluded that the “average student's performance suffered due to deficiencies in understanding prerequisite material and poor study habits.”

4.1.2 Background and Discussion on Graduate Level Evaluation

Unlike assessment and evaluation in underlying baccalaureate level program outcomes, graduate level classes are populated with students that are competent to practice by virtue of their degree’s accreditation. Therefore, graduate level assessment is fundamentally different than undergraduate. It has already been noted that professional practice has radically different assessment pattern and form than that experienced in undergraduate programs. Add to this the unique circumstances of
engineering education qualifying as an acceptable alternative to one year of professional practice and assessment becomes very challenging.

A graduate level program course such as CEPM recognizes this factor;

CEPM requires the student to develop the same ability for acquiring competency of learning outcomes that characterizes professional practice where licensed civil engineers self-certify their competency and qualifications for delivering course products or services.

4.1.2.1 Framework for CEPM Graduate Level Evaluation

For CEPM coursework and learning outcomes class in following with ASCE CEBoK learning outcomes, using Bloom’s taxonomy developed learning outcomes help the students to focus on the essential parts of the class. Where

1. CEPM coursework overlaps or builds upon the baccalaureate level program outcomes (using the ASCE CEBoK framework), the student is responsible for maintaining and certifying their competency in baccalaureate level program outcomes at all Bloom skill levels (1 thru 6);
2. CEPM coursework introduces new graduate level program outcomes, the student will acquire new knowledge and skills to augment their baccalaureate level competencies to practice professionally. As in professional practice or an academically equivalent experience such as CEPM, the student acquires this knowledge and skill through self-study and self-assessment and certain new skills will be acquired though coursework with instructor assessment and evaluations as follows: (Using Bloom)

**General:** In all student deliverables at any level, the CEPM instructors may require students to integrate one or more specific learning outcome areas into the deliverables. The CEPM instructors may segregate primary deliverables as necessary.

**Outstanding student performance in student deliverables and class simulations (“mock meetings”)** will be determinative for “A” grades. Only those students who prepare the optional PSDs for sessions 10, 11 and 12 as well as all mandatory deliverables and formally participate in documenting evaluations every week are eligible.

Instructors may waive optional deliverables without giving credit and may waive individual mandatory deliverables. In the latter case, all course students will receive a PASS grade for the waived deliverable.
Level 1: Knowledge represents the lowest level of learning outcomes in the cognitive domain.

The CEPM assessment framework assumes that the student will acquire this knowledge and skill through self-study and self-assessment in an environment similar to professional practice in preparation for a workshop meeting with team with informal communication.

The primary student deliverable (PSD) for this level is a PowerPoint covering key knowledge concepts, students role play of actors in workshop. No Student led Quality function or activity at this level.

Level 2: Comprehension represents learning outcomes one step beyond simple retention of learned material and represents the lowest level of understanding. The CEPM assessment framework assumes that the student will acquire this knowledge and skill through self-study and self-assessment in an environment similar to professional practice in preparation for a meeting with their team members as peers with formal communication requirements.

The primary student deliverable (PSD) for this level is a meeting outline or agenda with short narratives or bullet points covering key knowledge concepts, students role play actors in a team meeting using student or instructor provided scripts. No student led Quality function or activity at this level.

Level 3: Application represents learning outcomes that require a higher level of understanding than those under comprehension. The CEPM assessment framework assumes that the student will acquire this knowledge and skill through self-study and a mix of self and group assessment and informal instructor evaluation of a general nature in an environment similar to professional practice in the preparation of simple deliverables for formal communication to management staff on behalf of their team members.

The primary student deliverable (PSD) for this level is a 1-2 page “work product” covering key knowledge concepts, students role play actors in a management staff meeting using student or instructor provided scripts. This represents the threshold level for student Quality functions and activity.

Level 4: Analysis represents learning outcomes that require a higher intellectual level than comprehension and application because they require an understanding of both the content and the structural form of the material. For new learning outcomes in CEPM coursework, this represents the threshold for graduate level program instruction and assessment by instructors using materials and focusing instructional time on practice examples. The CEPM assessment framework assumes that the student will acquire this knowledge and skill through a mix of self-study and class time with a mix of self and group-assessment as well as informal and formal instructor evaluation in an environment similar to professional practice in preparation of specific
(i.e. instructor scoped) deliverables for formal communication to management staff as a mid-career engineering professional.

The primary student deliverable for this level is a 1-2 page “memorandum” covering key knowledge concepts.

Secondary deliverables (SSD) for this level may include for certain instructor identified learning outcomes, 2-4 page “reports” covering key knowledge concepts where the student is not expected to fully answer the question but must lay out what conclusions may be drawn at that time and lay out productive next steps or provide conformance analysis for products delivered by other using student or instructor developed scripts and rubrics.

Tertiary deliverables (TSD) for this level may include for certain instructor identified learning outcomes, schematics that cover key knowledge concepts.

For this level, students role play actors in a management staff meeting using instructor provided scripts.

Student Quality and acceptance activities (SQA) are minimally formalized using student or instructor provided scripts and as necessary rubrics.

This is the threshold level for formal assessment by CEPM instructors primarily by means of “homework assignments” assigned for learning outcomes identified on the grading table. No partial credit is given and material is graded as pass/fail only. Successfully completing all assignments in a timely manner and other factor corresponds to an overall grade of “C” in the course.

Level 5: Synthesis represents learning outcomes that emphasize creative behaviors and place major emphasis on the formulation of new patterns or structure. The CEPM assessment framework assumes that the student will acquire this knowledge and skill through a mix of self-study and class time with a mix of primarily detailed and scripted, self and group-assessment as well as informal and formal instructor evaluation in an environment similar to professional practice in preparation of specific (i.e. instructor scoped) deliverables for formal communication to senior management as a mid-career engineering professional.

The primary student deliverable for this level is a 1-2 page “whitepaper” covering key knowledge concepts where the student is developing solutions in the form of recommendations for future deliverables including scope, schedule and criteria for performance and acceptance that conform to stated constraints.

Secondary deliverables for this level may include for certain instructor identified learning outcomes, 2-4 page “reports” covering key knowledge concepts where the student is to develop recommendations not expected to fully answer the question but must lay out what
conclusions may be drawn at that time and lay out productive next steps or provide conformance analysis for products delivered by other using student or instructor developed scripts and rubrics.

Tertiary deliverables for this level may include for certain instructor identified learning outcomes, schematics, rubrics, criteria, lists, outlines that cover key knowledge concepts.

For this level, students role play actors in a senior management staff meeting using instructor provided scripts. Student participation at this level is predicated upon demonstrated proficiency on lower level materials.

Student Quality and acceptance activities are formalized using instructor provided scripts and rubrics.

This is the ceiling for formal assessment by CEPM instructors in this class and is accomplished by means of the class final exam (CFE) for the learning outcomes identified on the grading table. The CFE will be scored and give partial credit for work. The purpose of the CFE is to distinguish between B, and A students.

Level 6: Evaluation represents the highest level of learning outcomes in the cognitive domain. These outcomes contain all elements and requirements of the underlying levels as well as introducing the element of “conscious” or determinative value judgement based upon criteria. As this is not a capstone class, there is no primary student deliverable for this level but there may be products specified by the instructors.

This level is above the ceiling of formal assessment by CEPM instructors and assessment is accomplished by informal instructor evaluation of a specific nature.

The CEPM instructors reserve the right to make minor modifications to this framework as necessary to conduct the class and meet instructional objectives.
4.0 Moses Center Statement of Disability

If you are a student with a disability who is requesting accommodations, please contact New York University’s Moses Center for Students with Disabilities (CSD) at 212-998-4980 or mosescsd@nyu.edu. You must be registered with CSD to receive accommodations. Information about the Moses Center can be found at www.nyu.edu/csd. The Moses Center is located at 726 Broadway on the 2nd floor.

5.0 NYU Tandon School of Engineering Policies and Procedures on Academic Misconduct

A. **Introduction:** The School of Engineering encourages academic excellence in an environment that promotes honesty, integrity, and fairness, and students at the School of Engineering are expected to exhibit those qualities in their academic work. It is through the process of submitting their own work and receiving honest feedback on that work that students may progress academically. Any act of academic dishonesty is seen as an attack upon the School and will not be tolerated. Furthermore, those who breach the School’s rules on academic integrity will be sanctioned under this Policy. Students are responsible for familiarizing themselves with the School’s Policy on Academic Misconduct.

B. **Definition:** Academic dishonesty may include misrepresentation, deception, dishonesty, or any act of falsification committed by a student to influence a grade or other academic evaluation. Academic dishonesty also includes intentionally damaging the academic work of others or assisting other students in acts of dishonesty. Common examples of academically dishonest behavior include, but are not limited to, the following:

1. **Cheating:** intentionally using or attempting to use unauthorized notes, books, electronic media, or electronic communications in an exam; talking with fellow students or looking at another person’s work during an exam; submitting work prepared in advance for an in-class examination; having someone take an exam for you or taking an exam for someone else; violating other rules governing the administration of examinations.

2. **Fabrication:** including but not limited to, falsifying experimental data and/or citations.

3. **Plagiarism:** intentionally or knowingly representing the words or ideas of another as one’s own in any academic exercise; failure to attribute direct quotations, paraphrases, or borrowed facts or information.

4. **Unauthorized collaboration:** working together on work that was meant to be done individually.
5. **Duplicating work**: presenting for grading the same work for more than one project or in more than one class, unless express and prior permission has been received from the course instructor(s) or research adviser involved.

6. **Forgery**: altering any academic document, including, but not limited to, academic records, admissions materials, or medical excuses.
6.0: CEPM Session Outline

<table>
<thead>
<tr>
<th>Date</th>
<th>Week</th>
<th>Topic</th>
<th>Pre-Class Readiness</th>
<th>Pre-Class Assessment</th>
<th>In Class Assessment</th>
<th>Post Class Assessment</th>
<th>Student Deliverables</th>
<th>Learning Outcomes and Priority</th>
</tr>
</thead>
<tbody>
<tr>
<td>Jan 25, 2018</td>
<td>1</td>
<td>Course Overview: The civil engineering background; The Civil Engineering framework; Working definition of the term (ASCE, CMAA and PMI); Role of Knowledge and technology in Civil Engineering; Bodies of knowledge (ASCE and PMI) Dimensions of Civil Engineering Knowledge; Taxonomy and Ontology models in engineering knowledge;</td>
<td>See session scope of work</td>
<td>See session scope of work</td>
<td>See session scope of work</td>
<td>See session scope of work</td>
<td>PSD: Work memorandum SSD: None TSD: None SQA: None</td>
<td>CInfra 1 and 2, CECTxt 1 and 2 Acquire familiarity with NYU CEPM syllabus and rubrics</td>
</tr>
</tbody>
</table>

January 2018 Syllabus complete and Sessions 1 thru 5 planned
<table>
<thead>
<tr>
<th>Date</th>
<th>Week</th>
<th>Topic</th>
<th>Pre-Class Readiness</th>
<th>Pre-Class Assessment</th>
<th>In Class Assessment</th>
<th>Post Class Assessment</th>
<th>Student Deliverables</th>
<th>Learning Outcomes and Priority</th>
</tr>
</thead>
<tbody>
<tr>
<td>Feb 1, 2018</td>
<td>2</td>
<td>The Civil Engineering Context (CECntxt)</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>Microeconomic Problems MPI, MiPP, MaPP.</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>Sociology of Professions (SoP)</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>Civil Engineering Communication (CECom)</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Feb 8, 2018</td>
<td>3</td>
<td>Sociology of Professions (SoP)</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>Civil Engineering Communication (CECom)</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>Civil Engineering Process (CEP).</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

**Examples of deliverables and assessments:**
- **Mandatory Deliverables:**
  - PSD: Work memorandum
  - SoP 2(b), CEP 1 (Both Opt.)
- **Optional Deliverables:**
  - SSD: None
  - TSD: None
  - SQA: Informal

**Learning Outcomes and Priority:**
- Continue to acquire familiarity with NYU CEPM syllabus and rubrics.
<table>
<thead>
<tr>
<th>Date</th>
<th>Week</th>
<th>Topic</th>
<th>Pre-Class Readiness</th>
<th>Pre-Class Assessment</th>
<th>In Class Assessment</th>
<th>Post Class Assessment</th>
<th>Student Deliverables</th>
<th>Learning Outcomes and Priority</th>
</tr>
</thead>
<tbody>
<tr>
<td>Feb 15, 2018</td>
<td>4</td>
<td>Civil Engineering Process (CEP) Civil Engineering Controls (CECds)</td>
<td></td>
<td></td>
<td></td>
<td>Students role play actors in a level 2 environment using Session 3 deliverables with student or instructor provided scripts</td>
<td>Assess Session 4 deliverables</td>
<td>PSD: (1) Work memorandum (2) CEP 2, either a, b, or c AND d SSD: None TSD: None SQA: Informal</td>
</tr>
<tr>
<td>Feb 22, 2018</td>
<td>5</td>
<td>Civil Engineering Communication (CECom) Civil Engineering Process (CEP) Civil Engineering Controls (CECds)</td>
<td></td>
<td></td>
<td></td>
<td>Students role play actors in a level 3 environment using Session 4 deliverables with student or instructor provided scripts</td>
<td>Assess Session 5 deliverables</td>
<td>PSD: (1) Work memorandum b (2) Integrated CECom 3 CEP 3 and CECds 2</td>
</tr>
<tr>
<td>Mar 1, 2018</td>
<td>6</td>
<td>Civil Engineering Communication (CECom)</td>
<td></td>
<td></td>
<td></td>
<td>Students role play actors in a</td>
<td>Assess</td>
<td>PSD: (1) Work memorandum b (2) Integrated</td>
</tr>
</tbody>
</table>

January 2018 Syllabus complete and Sessions 1 thru 5 planned Page 24
<table>
<thead>
<tr>
<th>Date</th>
<th>Week</th>
<th>Topic</th>
<th>Pre-Class Readiness</th>
<th>Pre-Class Assessment</th>
<th>In Class Assessment</th>
<th>Post Class Assessment</th>
<th>Student Deliverables</th>
<th>Learning Outcomes and Priority</th>
</tr>
</thead>
<tbody>
<tr>
<td>Mar 8, 2018</td>
<td>7</td>
<td>Civil Engineering Process (CEP) Civil Engineering Controls (CECtls)</td>
<td>level 3 environment using Session 5 deliverables with student or instructor provided scripts</td>
<td>Session 6 deliverables</td>
<td>CECom 4, CEP 4 and CECtls 3 (Ops.)</td>
<td>SSD: None TSD: None SQA: Threshold Quality</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Mar 15, 2018</td>
<td>8</td>
<td>Civil Engineering Communication (CECom) Civil Engineering Process (CEP) Civil Engineering Controls (CECtls) Civil Engineering Design (CED)</td>
<td>Students role play actors in a level 3 environment using Session 6 deliverables with student or instructor provided scripts</td>
<td>Assess Session 7 deliverables</td>
<td>PSD: (1) Work memorandums, (2) Integrated CECtls 5, CED 2 SSD: CECtls 4 (Ops.) SQA: Formal using criteria</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>Students role play actors in a level 3</td>
<td>Assess Session 8 deliverables</td>
<td>PSD: (1) Work memorandums, (2) Integrated CECtls 5 and CED 2</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

CEPM Syllabus and Rubric (Spring 2017)

January 2018 Syllabus complete and Sessions 1 thru 5 planned Page 25
<table>
<thead>
<tr>
<th>Date</th>
<th>Week</th>
<th>Topic</th>
<th>Pre-Class Readiness</th>
<th>In Class Assessment</th>
<th>Post Class Assessment</th>
<th>Student Deliverables</th>
<th>Learning Outcomes and Priority</th>
</tr>
</thead>
<tbody>
<tr>
<td>Mar 22, 2018</td>
<td>9</td>
<td>Design (CED) Civil Engineering Construction (CEC)</td>
<td></td>
<td></td>
<td>SSD: None TSD: None SQA: Formal using criteria</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>Sociology of Professions (SoP) Civil Engineering Design (CED) Civil Engineering Construction (CEC) Civil Engineering Project Management (CEPM)</td>
<td></td>
<td></td>
<td>SSD: SoP 3 (Opt.) TSD: None SQA: Formal using criteria</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Mar 29, 2018</td>
<td>10</td>
<td>Microeconomic Problems (MaPP) Civil Engineering Design (CED)</td>
<td></td>
<td></td>
<td>PSD: (1) Work memos (2) CEC 2 (c) and (d) SSD: CEC 3 (Opt.) TSD: MaPP 1 CED 4 CEC 3 CEPM 2</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>Students role play actors in a level 4 environment using</td>
<td></td>
<td></td>
<td>Assessment: Session 9 deliverables</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>Microeconomic Problems (MaPP) Civil Engineering Design (CED)</td>
<td></td>
<td></td>
<td>PSD: (1) Work memos (2) CEC 2 (c) and (d) SSD: CEC 3 (Opt.) TSD: MaPP 1 CED 4 CEC 3 CEPM 2</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>Students role play actors in a level 4 environment using</td>
<td></td>
<td></td>
<td>Assessment: Session 10 deliverables</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

January 2018

Syllabus complete and Sessions 1 thru 5 planned
<table>
<thead>
<tr>
<th>Date</th>
<th>Week</th>
<th>Topic</th>
<th>Pre-Class Readiness</th>
<th>Pre-Class Assessment</th>
<th>In Class Assessment</th>
<th>Post Class Assessment</th>
<th>Student Deliverables</th>
<th>Learning Outcomes and Priority</th>
</tr>
</thead>
<tbody>
<tr>
<td>April 15, 2018</td>
<td>11</td>
<td>Civil Engineering Construction (CEC) Civil Engineering Project Management (CEPM)</td>
<td>These are all Level 3 outcomes: distinguish between CM and PM; Project Development (Scope Management); Requirements; WBS; Validate and control scope.</td>
<td>Students role play actors in a level 4 environment using Session 10 deliverables with student or instructor provided scripts</td>
<td>Assess Session 11 deliverables.</td>
<td>SQA: Formal using rubrics</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>Civil Infrastructure (CInfra) Civil Engineering Design (CED) Civil Engineering Construction (CEC) Civil Engineering Project Management (CEPM)</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>Civil Engineering Project Management (CEPM)</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

- PSD: (1) Work memoranda, (2) CEPM 3
- SSD: CED 5  (Opt.)
- TSD: CEC 4  (Opt.)
- SQA: Formal using rubrics

Civil Infrastructure (CInfra) 3
Civil Engineering Design (CED) 5
Civil Engineering Construction (CEC) 4  (Opt.)
Civil Engineering Project Management (CEPM) 3

January 2018
Syllabus complete and Sessions 1 thru 5 planned
Page 27
<table>
<thead>
<tr>
<th>Date</th>
<th>Week</th>
<th>Topic</th>
<th>Pre-Class Readiness</th>
<th>Pre-Class Assessment</th>
<th>In Class Assessment</th>
<th>Post Class Assessment</th>
<th>Student Deliverables</th>
<th>Learning Outcomes and Priority</th>
</tr>
</thead>
<tbody>
<tr>
<td>April 12, 2018</td>
<td>12</td>
<td>Civil Infrastructure (CInfra)</td>
<td>Students role play actors in a level 4 environment using Session 11 deliverables</td>
<td></td>
<td></td>
<td>Assess Session 12 deliverables.</td>
<td></td>
<td>CInfra 4</td>
</tr>
<tr>
<td></td>
<td></td>
<td>The Civil Engineering Context (CECntxt)</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>CCntxt 4</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Sociology of Professions (SoP)</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>SoP 4</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Civil Engineering Construction (CEC)</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>CEC 5</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Civil Engineering Project Management (CEPM)</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>CEPM 4</td>
</tr>
<tr>
<td></td>
<td></td>
<td><strong>These are all Level 3 outcomes</strong></td>
<td>Students role play actors in a level 5 environment using Session 12 deliverables</td>
<td></td>
<td></td>
<td>Assess Session 13 deliverables.</td>
<td></td>
<td>CInfra 5</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Project Cost and Schedule Management (CEPM)</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>CCntxt 5</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>CEPM 5</td>
</tr>
<tr>
<td></td>
<td>13</td>
<td>Civil Infrastructure (CInfra)</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>CInfra 5</td>
</tr>
<tr>
<td></td>
<td></td>
<td>The Civil Engineering Context (CECntxt)</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>CCntxt 5</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Civil Engineering Construction (CEC)</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>CEC 5</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Civil Engineering Project Management (CEPM)</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>CEPM 5</td>
</tr>
<tr>
<td>Date</td>
<td>Week</td>
<td>Topic</td>
<td>Pre-Class Readiness</td>
<td>Pre-Class Assessment</td>
<td>In Class Assessment</td>
<td>Post Class Assessment</td>
<td>Student Deliverables</td>
<td>Learning Outcomes and Priority</td>
</tr>
<tr>
<td>--------------</td>
<td>------</td>
<td>----------------------------------------------------------------------</td>
<td>---------------------</td>
<td>----------------------</td>
<td>----------------------</td>
<td>------------------------</td>
<td>-----------------------</td>
<td>-------------------------------</td>
</tr>
<tr>
<td>April 26, 2018</td>
<td>14</td>
<td>Civil Infrastructure (CInfra)</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>PSD: Work memorandum</td>
<td>CInfra 6</td>
</tr>
<tr>
<td></td>
<td></td>
<td>The Civil Engineering Context (CECntxt)</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>SSD: None</td>
<td>CECntxt 6</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Civil Engineering Construction (CEC)</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>TSD: None</td>
<td>CEC 6</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Civil Engineering Project Management (CEPM)</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>SQA: None</td>
<td>CEPM 6</td>
</tr>
<tr>
<td>May 3, 2018</td>
<td>15</td>
<td>Course review and Study guide</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>Mandatory Deliverable</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>Optional Deliverable</td>
<td></td>
</tr>
<tr>
<td>May 10, 2018</td>
<td>16</td>
<td>Final Exam</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
### 7.0: OUTCOME - INSTRUCTION PERIOD

#### CROSS CHECK

<table>
<thead>
<tr>
<th>Instruction period</th>
<th>1</th>
<th>2</th>
<th>3</th>
<th>4</th>
<th>5</th>
<th>6</th>
<th>7</th>
<th>8</th>
<th>9</th>
<th>10</th>
</tr>
</thead>
<tbody>
<tr>
<td>Learning Outcomes</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Civil Infrastructure (CInfra)</td>
<td>CInfra 1 and 2</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>The Civil Engineering Context (CECntxt)</td>
<td>CECntxt 3</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Sociology of Professions (SoP)</td>
<td>SoP 1</td>
<td>SoP 2</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>SoP 3</td>
<td></td>
</tr>
<tr>
<td>Economic Problems</td>
<td>MPI 1, MiPP 1</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>MaPP 1</td>
</tr>
<tr>
<td>Civil Engineering Communication (CECom)</td>
<td>CECom 1</td>
<td>CECom 2</td>
<td>CECom 3</td>
<td>CECom 4</td>
<td>CECom 5</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Civil Engineering Process (CEP)</td>
<td>CEP 1</td>
<td>CEP 2</td>
<td>CEP 3</td>
<td>CEP 4</td>
<td>CEP 5</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Civil Engineering Controls (CECars)</td>
<td>CECars 1</td>
<td>CECars 2</td>
<td>CECars 3</td>
<td>CECars 4</td>
<td>CECars 5</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Civil Engineering Design (CED)</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Civil Engineering Construction (CEC)</td>
<td>CEC 1</td>
<td>CEC 2</td>
<td>CEC 3</td>
<td>CEC 4</td>
<td>CEC 5</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Civil Engineering Project Management (CEPM)</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Instruction Hours</td>
<td>150 minutes net of breaks</td>
<td>150 minutes net of breaks</td>
<td>150 minutes net of breaks</td>
<td>150 minutes net of breaks</td>
<td>150 minutes net of breaks</td>
<td>150 minutes net of breaks</td>
<td>150 minutes net of breaks</td>
<td>150 minutes net of breaks</td>
<td>150 minutes net of breaks</td>
<td>150 minutes net of breaks</td>
</tr>
</tbody>
</table>

Final Exam is considered to be an instructional session of 150 minutes length net of breaks.