Colorado State University
COLLEGE OF HEALTH AND HUMAN SCIENCES
Department of Construction Management

Graduate Student Handbook

Fall 2016
Master of Science in Construction Management

The Department of Construction Management offers graduate study leading to the Master of Science degree. The focus of the department is on professional programs that successfully combine theory and application with a strong emphasis in applied management. The master’s program is an advanced curriculum designed to allow students to tailor a portion of the specialization requirements to meet individual interests and goals. Graduate students may work with their faculty advisor to develop a focused program of study.

The learning objectives of this program are:

1) Students will identify research problem(s), develop research question(s), design research methodologies, collect and analyze data, and interpret research results as components of scientific research.

2) Students will develop critical thinking skills needed to conceive, develop, test, and refine scientific ideas and hypotheses.

3) Students will communicate the results of their original research in a clear and well organized manner both in written (proposal, thesis or professional paper) and verbal (thesis or professional paper oral defense) format.

4) Students will write manuscript(s) for submission to a refereed scientific journal or a conference based on their research.

5) Students will develop expertise in one or more fields of construction management at which the student can successfully function in the profession (either academia or industry).

Each construction management graduate student must complete a final project of professional quality to demonstrate his/her capability in their area of interest and his/her readiness for professional practice. The final research project is original work, involving a substantial degree of independent research and analysis. The research project results are presented as either a Thesis (Plan A) or Professional Research Paper (Plan B). Each student will work with their advisor to determine if a thesis or a professional paper is more appropriate. Each graduate student is required to submit an article to a journal or proceedings approved by the advisor prior to graduation.

The goal of the program is to provide graduate students with skills related to advance construction management problem solving. To attain this goal, the CM department encourages students to perform applied research that is industry, institutional, or "client" based.

- **Plan A (Thesis)**
  Plan A is normally selected by those wanting to pursue answers to a specific research topic and envisioning a career in applied research. The thesis process also provides students interested in pursuing advanced degrees with important experience in research methodologies and processes. It typically follows traditional models of scientific inquiry and reporting (both qualitative and quantitative modes of inquiry are acceptable). A thesis research project investigates and answers a research problem that the student defines as significant. The relevance of the research problem is demonstrated through a literature review which shows how the proposed research will contribute to prior research efforts, theory and/or practice. The student defines the research problem in the form of a hypothesis or a central focus and describes how their research will test/answer the central thesis topic. The thesis describes all of
the aforementioned background material (i.e., statement of the problem, literature review, statement of hypothesis/focus, and research methodology) and documents the study analyses and results. The thesis should conclude by relating the research contributions back to the relevant theory, current practice and perhaps provide some direction for future research. A minimum of 33 upper-division credits are required for Plan A students.

- **Plan B (Professional Research Paper)**
  Students who want to develop technical proficiency in a particular area or emphasis may choose Plan B. Professional research paper is not held to the same standards for replicability of the research methodology used for a thesis. Results from a professional paper may be directed toward providing a solution to a specific applied problem for a small audience. There is an expectation that the professional paper could still be published, but the outlets would likely be different than those of a thesis. A minimum of 36 upper-division credits are required for Plan B students.

**Student-Faculty Interaction**
Faculty Committees set up to work with students exist to monitor and to contribute to the content and quality of the product. The primary interaction will be between the student and advisor. In general, when asked to become involved in a research project, and in agreeing to do so, the faculty member is making a commitment to work with the student. This means that he or she will want to be updated regularly, will want to know what progress (or lack thereof) is being made, and will want to know what problems have been encountered, solved, etc. However, all faculty do not operate this way, and you should definitely check with your advisor and follow his/her instructions.

With regard to Committees, you may wish to meet with all members of the Committee. Generally you will need to consult with your advisor to determine if a full committee meeting is warranted at the beginning of the research project. If approved by the advisor, the student will be responsible for setting up the meeting date, time, and location. The purpose of a full committee meeting is to ensure that everyone is clear on expectations regarding the proposal, research, and completed product. The Committee serves a dual role: it evaluates your professional competency and helps you stay focused on completing a polished product. You should take full advantage of Committee advice and support.
CONSTRUCTION MANAGEMENT GRADUATE CURRICULUM EFFECTIVE FALL 2016

CORE COURSES (21 credits for Plan A or 18 credits for Plan B)

(F) = Fall, (S) = Spring, (SS) = Summer

<table>
<thead>
<tr>
<th>Course</th>
<th>Title</th>
<th>Credits</th>
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</thead>
<tbody>
<tr>
<td>CON502</td>
<td>Research in Construction Management I (F)</td>
<td>3</td>
</tr>
<tr>
<td>CON503</td>
<td>Research in Construction Management II (S)</td>
<td>3</td>
</tr>
<tr>
<td>CON511</td>
<td>Project Procurement and Preconstruction (F)</td>
<td>3</td>
</tr>
<tr>
<td>CON512</td>
<td>Post-Award Construction Management (S)</td>
<td>3</td>
</tr>
<tr>
<td>CON521</td>
<td>Sustainable Building &amp; Infrastructure Systems (S)</td>
<td>3</td>
</tr>
<tr>
<td>CON699</td>
<td>Thesis (Required for Plan A) (F, S, SS)</td>
<td>6</td>
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<tr>
<td>or</td>
<td></td>
<td></td>
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<tr>
<td>CON698</td>
<td>Research in CM (Required for Plan B) (F, S, SS)</td>
<td>3</td>
</tr>
</tbody>
</table>

ELECTIVES (12 credits for Plan A or 18 credits for Plan B)

- Elective options include 300-600 level courses as approved by the faculty advisor.
- Courses may be taken from the Department of Construction Management or other programs from across campus.
- A minimum of 1 CON graduate elective course (which cannot be CON 695) is required for Plan A.
- A minimum of 2 CON graduate elective courses (which cannot be CON 695) are required for Plan B.
- A maximum of 3 credits of CON 695 are allowed.
- Courses should enhance the student's knowledge in a chosen topic and complement the student's graduate coursework and research interests.

GRADUATE LEVEL ELECTIVE OPTIONS OFFERED* IN THE DEPARTMENT OF CONSTRUCTION MANAGEMENT

CON561 Applied Productivity Improvement (F)                         CON684** Supervised College Teaching (F, S)
CON565 Legal Issues (S)                                            CON687** Internship (F, S, SS)
CON568 Construction Industry Institute Best Practices (F)         CON695** Independent Study (F, S, SS)
CON569 Regulatory Impact on Construction (S)                      CON 577 Leadership of Sustainable Community Projects (S)
CON571 Facility Planning and Management (F)                       

*: All elective courses are not guaranteed to be offered every academic year.

**: Students who would like to register for supervised college teaching, internship, or independent study credits will need to identify a faculty sponsor to draft a plan and deliverables resulting from those experiences. The deliverables cannot be the used toward the student's thesis or professional research paper. The student will be advised by her/his faculty sponsor during the course of the supervised college teaching, internship, or independent study. The typical deliverable of such an experience is a paper co-authored by the student and her/his faculty sponsor.

DEPARTMENT GRADUATION REQUIREMENTS

- Submit a journal or proceedings article with your faculty advisor.
- Submit PDF copy of your Thesis or Professional Paper to the Graduate Program Advisor.
Course Descriptions

CON476 Sustainable Building-Design & Construction - Major components of sustainable design and construction, including energy, healthy buildings, cultural, natural resource use and other environmental and economic issues of sustainable built environments.

CON 502 Research in Construction Management I - Research, discuss, and present current issues and trends in the construction industry related to business, management, engineering, and technology.

CON 503 Research in Construction Management II - Models and methods of disciplined inquiry used in diverse application-based organizations. Preparation to use disciplined inquiry methods to solve applied problems in construction management or related fields. Topics include problem/topic selection, writing research questions and objectives, literature reviews, selection of research methods, data collection and analysis, and conclusions and implications.

CON 511 Project Procurement and Preconstruction - Advanced project procurement procedures with a focus on early design phase planning applications and preconstruction management techniques.

CON 512 Post-Award Construction Management - Advanced topics related to post-award construction management issues with a focus on multiple project controls and project risk management.

CON 521 Sustainable Building & Infrastructure Systems - Issues and state-of-the-art resources needed to construct, remodel/retrofit, operate and maintain the built environment (buildings and infrastructure). Specifically, resources will include major materials, components and technologies, as well as energy and water resources are needed in the different life-cycle phases of the building or infrastructure project.

CON 561 Applied Productivity Improvement - Existing and emerging tools for productivity enhancement in project and production environment.

CON 565 Legal Aspects of Construction Process - Common points of dispute; methods of avoiding disputes among owner, architect, engineer, and contractor.

CON 568 Construction Industry Institute Practices - Senior executives from the Construction Industry Institute (CII) present best practices developed by CII over the last 25 years.

CON 569 Regulatory Impact on Construction - Role government plays in the design and construction of the built environment.

CON 571 Facility Planning and Management - Planning, organizing and managing large educational and/or commercial facilities.

CON 577 Leadership of Sustainable Community Projects
Learn and apply principles of sustainable construction management through leading and building service-learning projects.

CON 684 Supervised College Teaching
Earn credit for assisting faculty with course preparation, teaching, and/or grading. Must find faculty sponsor and get Supervised College Teaching Form from CM Advising Office.

CON 687 Internship* - Earn credit for participating in an internship working in the construction industry. Must find faculty sponsor and get Graduate Internship Form from CM Advising Office.

CON 695 Independent Study * - Earn credit for independent study research or project. Must find faculty sponsor and get Independent Study Form from CM Advising Office.

*Students who would like to register for internship or independent study credits will need to identify a faculty sponsor to draft a plan and deliverables resulting from those experiences. The deliverables cannot be the used toward the student’s thesis or professional research paper. The student will be advised by her/his faculty sponsor during the course of the internship or independent study. The typical deliverable of such an experience is a paper co-authored by the student and her/his faculty sponsor.
Resources

- Construction Management Website- Graduate Section
  http://www.cm.colostate.edu/students/graduate/index.aspx

- Advisors
  - The CM Graduate Program Advisor serves as a liaison to graduate students. This advisor processes all administrative documentation for CM graduate students as well as answer questions and provides support for class registration. The CM Graduate Program Advisor meets with prospective, new, and continuing CM graduate students.

    Advising Appointments are available Monday-Thursday from 9am-12pm and 1pm-4pm
    Contact the Advising Office at (970) 491-7354, CMGradAdvising@colostate.edu, 222B Guggenheim Hall

  - Upon admission to the graduate program students are assigned a temporary faculty advisor. Your faculty advisor will assist you in investigating research interests, potential committee members, and permanent adviser options. Once research interests are considered you will select your permanent advisor, who also serves as chairperson of your graduate committee. You must notify the Department in writing once your permanent advisor has been selected.

    My temporary advisor is ________________________________

    My faculty advisor and chair of my graduate committee is ________________________________

- Graduate School
  - Website www.graduateschool.colostate.edu
    - Term Deadline Dates
    - Graduate School Resources

  - Graduate and Professional Bulletin
    - Student Rights and Responsibilities
    - Graduate School Policies and Procedures

- Financial Considerations
  - Tuition and Fees http://registrar.colostate.edu/student-resources/tuition-fees/
  - Student Financial Services http://www.sfs.colostate.edu/
    - Types of Financial Aid
    - Applying for Financial Aid
  - See “Financial Assistance and Graduate Assistantships” at: http://www.cm.chhs.colostate.edu/students/graduatefinancial.aspx

- Graduate Student Mandatory Health Insurance Policy
  - All new, incoming full-fee paying resident-instruction graduate students enrolled in 6 credits or more will be required to enroll in the CSU student health insurance plan or to opt-out by demonstrating health insurance coverage at a comparable level.
  - For detailed information visit: http://graduateschool.colostate.edu/policies-and-procedures/health-insurance/
Steps to Student Degree- Construction Management Quick Reference
(Adapted from Graduate School’s Steps to Student Degree)

**STEP 1 - REGISTRATION**
- **Description:** Students must be registered every fall and spring semester in a credit-bearing course or in continuous registration (CR). If graduating in summer, registration in a course or CR is required
- **Timeline:** Every spring and fall semester  ([More Information](#))

**STEP 2 - ADVISOR & COMMITTEE**
- **Description:** Select advisor and committee in consultation with your department
- **Timeline:** Prior to filling out the GS6 Form, Program of Study

**STEP 3 - GS6 FORM, PROGRAM OF STUDY**  
*student fills out form then submits to CM Graduate Program Advisor for review and to collect faculty advisor & department head signatures*
- **Description:** List of courses, the members of your committee, and other requirements to complete your degree
- **Timeline:** Submitted to the Graduate School prior to your fourth regular semester registration

**STEP 4 - GS25 FORM, APPLICATION FOR GRADUATION**  
*student fills out form then submits to CM Graduate Program Advisor for review and to collect faculty advisor & department head signatures*
- **Description:** Lists the term that you plan on completing your graduation requirements, the name that you want printed on your diploma, any course changes that may need to be made to your GS6 Form, Program of Study, any discrepancy grades that need to be addressed, and any departmental requirements that need to be satisfied
- **Timeline:** Submitted to the Graduate School by the [deadline date](#) of the semester that you intend on completing your degree requirements

**STEP 5 - GS9A FORM, PETITION FOR COMMITTEE MEMBER CHANGES**  
*student fills out form, collects faculty signatures then submits to CM Graduate Program Advisor for department head signatures*
- **Description:** Lists any changes that have been made to your committee since your GS6 Form, Program of Study was approved by the Graduate School
- **Timeline:** As changes occur, but after your GS6 Form, Program of Study has been approved by the Graduate School, and prior to your preliminary (Ph.D. students) or final examinations

**STEP 6 - FINAL EXAMINATION/DEFENSE**

**STEP 7 - GS24 FORM, REPORT OF FINAL EXAMINATION RESULTS**
- **Description:** Members of your committee sign this form after you have completed your final examination/defense
- **Timeline:** Submitted to the Graduate School within two working days after the results of the examination are known, and by the [deadline date](#) of the semester that you intend on completing your degree requirements

**STEP 8 - COMPLETE SUBMISSION OF YOUR THESIS OR DISSERTATION TO THE GRADUATE SCHOOL**
- **Description:** If a thesis or dissertation is required for your degree ([More Information](#))
- **Timeline:** Submitted to the Graduate School by the [deadline date](#) of the semester that you intend on completing your degree requirements

**STEP 9 – SUBMIT CM GRADUATION CLEARANCE FORM, CM GRADUATE PROGRAM ADVISOR SUBMITS GRADUATION CLEARANCE GS25B**
- **Description:** Student must submit article to journal or proceedings, submit electronic version of thesis/professional paper to CM Advising, collect faculty advisor signature on CM Internal Clearance Form, submit form to CM advisor for graduation clearance. CM Advisor then prepares GS25B, collects department head signature, and forwards GS25B to Graduate School
- **Timeline:** Submitted to the CM Graduate Program Advisor the last day of classes (before finals)
Graduate School Forms

Below is a list of the most common (and required) forms for Construction Management graduate students. All Graduate School forms and instructions can be found at:
http://www.graduateschool.colostate.edu/current-students/forms/index.aspx

GS6 Program of Study
The Program of Study is a document which lists all courses taken in pursuit of the degree as well as the graduate committee. This is the formal statement of what is done to achieve the degree, the summary of all academic planning. The Program of Study must be filed with the Graduate School before the time of the fourth regular semester registration. Students who fail to meet this requirement may be denied subsequent registration. In addition, this form must be submitted to the Graduate School prior to applying for graduation.

GS9A Petition for Committee Member Changes
This form is used to make changes to a student's committee after the student's GS6 Program of Study has been approved by the Graduate School. A student’s committee must be up-to-date at the time of the preliminary examination (Ph.D. students), final examination/defense, and thesis/dissertation submission.

GS24 Report of Final Examination Results
All Ph.D. students and Master’s Plan A and Plan B students are required to complete and pass a final examination/defense. The examination must be held by the published deadline of the student’s graduating term. The completed and signed form must be submitted to the Graduate School Office within two working days after the results of the examination are known.

GS25 Application for Graduation
A student must apply for graduation by the published deadline of the student’s graduating term. A student applying to graduate for the first time must submit this form.

Reapplication for Graduation
An online process for a student who has applied to graduate in a previous term and who needs to update to a future term. A student must reapply for graduation by the published deadline of the student’s updated graduating term.

For the GS6, GS9A, and GS25: student fills out form then submits to CM Graduate Advisor for review, advisor will collect faculty advisor & department head signatures.

Program of Study
At least 24 credits must be earned at Colorado State, 21 of which must be earned after admission to the Graduate School. These totals may include courses taken through the Distance Degree program.

At least 16 of the credits earned at Colorado State must be in the courses numbered 500 or above. Of the 16, at least 12 must be in regular (lecture/laboratory) courses.
**Graduate Advisor and Committee Makeup**

All graduate committees must include at minimum a faculty advisor, committee member, and outside committee member. From [http://www.graduateschool.colostate.edu/current-students/student-resources/committee.aspx](http://www.graduateschool.colostate.edu/current-students/student-resources/committee.aspx):

**ADVISOR**

**WHO CAN SERVE:** Professor, Associate Professor, or Assistant Professor within the department or program granting the degree.

**CO-ADVISOR (not required)**

**WHO CAN SERVE:** Professor, Associate Professor, Assistant Professor, Instructor, or Faculty Affiliate.

**COMMITTEE MEMBER**

**WHO CAN SERVE:** Professor, Associate Professor, Assistant Professor, Instructor, or Faculty Affiliate.

**OUTSIDE COMMITTEE MEMBER**

**WHO CAN SERVE:** Professor, Associate Professor, Assistant Professor, or Instructor with a regular, special, transitional, joint, or emeritus/emerita faculty appointment at CSU. This appointment must be outside the department of the student.

**SPECIAL NOTES:**
- A faculty member who holds only a temporary or faculty affiliate appointment cannot serve as an outside committee member.
- A faculty member who is tenured in the student's department cannot serve as the student's outside committee member.
- A faculty member who holds a joint faculty appointment in the student's department cannot serve as the student's outside committee member.
- A faculty member may hold a primary appointment in an academic department but also holds a joint faculty appointment in another academic department. He/she cannot serve as an outside committee member for a graduate student in either department. As an example, a Professor in the Physics Department who also holds a joint faculty appointment as an Associate Professor in the Mathematics Department cannot serve as the outside committee member for a student in either the Physics or Mathematics Departments.

Please review "The Advisory System" found in Section E.1.1 of the **Graduate & Professional Bulletin** for the complete policy.

Department of Construction Management policy: Emeritus Faculty of the Department of Construction Management can only serve as a co-advisor or committee member in graduate student committees with active faculty member serving as the primary advisor. The intent of the policy is to give the Emeritus Faculty the opportunity to provide mentorship to active faculty members.

**Responsible Conduct of Research (RCR) training and certification program**

According to CSU policy ([http://rcr.colostate.edu/index.html](http://rcr.colostate.edu/index.html)), all undergraduate students, MS/PhD students, and postdoctoral fellows engaged in research are **required** to take this training. This training provides a broad understanding of the 9 core RCR competencies, and the content should be appropriate for all research/scholarly inquiry disciplines and all levels of trainees. Many testers from different disciplines were able to complete the training in less than 1 hour. The URL to initiate the training is: [http://rcr.colostate.edu/training.html](http://rcr.colostate.edu/training.html). Once you have read the material, trainees should register to take the Final Mastery Quiz and print the “Certificate of Completion” for their own records. The university will also be able to track and verify which trainees have successfully completed the Mastery Quiz and will send this information back to the department.
**Leveling Requirements**

Students admitted to the Master of Science program in Construction Management at Colorado State University, with degrees in disciplines other than baccalaureate construction programs, may be required to complete a series of undergraduate courses to fulfill leveling requirements. Leveling course requirements will be determined for each applicant depending on academic background and work experience. This evaluation is completed by the Graduate Program Coordinator once the applicant is selected for admission. Admitted students may be required to take some or all of the leveling courses as determined by the Graduate Program Coordinator. **Leveling course credits cannot be used towards the required credits for the Graduate Program of Study.** Students required to take leveling courses should score a “B” or higher to clear the requirement and leveling courses cannot be audited or taken in a pass/fail grading scheme.

Leveling courses include:
- CON 265 Plan Reading and Quantity Survey (3 credit)
- CON 365 Estimating II (3 credits)
- CON 367 Construction Contracts and Project Administration (3 credits)
- CON 461 Scheduling and Cost Control (3 credits)

**Advisor Requirements**

CM Graduate Program Advisor will put a registration hold on all first year graduate students starting October 1st for Spring registration. To have the hold removed, students must secure a permanent faculty advisor or meet with the Graduate Program Coordinator to discuss progress toward securing a faculty advisor. Once a permanent faculty advisor is confirmed, the registration hold will be removed.

**Program of Study Requirements**

CM Graduate Program Advisor will put a registration hold on all first year graduate students starting March 15th for Fall registration. To have the hold removed, students must complete and submit their Program of Study (GS6 form) to the Graduate School. Once that form is submitted, the registration hold will be removed.

**Time Limit for Degree Completion**

Each semester, the CM Graduate Program Advisor will put an advising hold on students who have completed coursework but not thesis/paper or students who are registering for Continuous Registration but have courses needed to be completed. Approval from faculty advisor is required to lift hold based on progress toward degree completion.

Based on Graduate School guidelines, “E.1.3 SCHOLASTIC STANDARDS”, when a student’s graduate advisory committee or an appropriate departmental graduate committee finds that a student is making unsatisfactory progress toward the degree and that satisfactory progress cannot be anticipated, a plan should be created with the faculty advisor as a course of action. The progress toward degree completion will be limited to five years.

**Departmental Graduation Requirements**

- Submit a journal or proceedings article with your faculty advisor
- Submit an electronic PDF copy of your Thesis or Professional Paper to the CM Graduate Program Advisor

**Commencement**

The Graduate School hosts a commencement ceremony for all Master’s and Doctoral degrees each Fall and Spring semester.

For commencement dates, details, and FAQ visit: [http://commencement.colostate.edu/](http://commencement.colostate.edu/)
Student Goals and Timeline

First Semester

✓ Familiarize yourself with Graduate School requirements, forms, and due dates
✓ Meet with your temporary faculty advisor
✓ Explore your research interests and meet with department faculty
✓ Communicate your ideas with different faculty with the idea of identifying potential advisors and committee members
✓ Identify your permanent advisor

Second Semester/Third Semester

✓ Select committee and finalize GS-6 Program of Study with your advisor no later than the end of the second semester
✓ Have an initial committee meeting to plan the proposal
✓ Provide a draft of your research proposal to the advisor
✓ Obtain approval of topic and proposal format and content by faculty advisor
✓ Incorporate advisor’s recommendations and submit the final draft of the research proposal to the committee
✓ Arrange a meeting with committee to review and obtain approval of proposal by supervising committee members (it may take more than one meeting to obtain full committee approval)
✓ Incorporate committee’s recommendations into the final research proposal
✓ File H-100 form with CSU Institutional Review Board (IRB) if applicable. This must be done with the faculty advisor serving as the PI (Principal Investigator)
✓ Perform research after receiving IRB approval (if applicable)

Third/Fourth/Final Semester

✓ Provide a draft of your Thesis/Professional Research Paper to the faculty advisor
✓ Incorporate advisor’s recommendations and submit the final draft to the committee
✓ Submit GS-25 Application for Graduation (no later than Week 6 of your graduating term)
✓ Prepare journal/proceedings article with the faculty advisor
✓ Arrange a presentation/defense with committee to review and obtain approval of Thesis/Professional Research Paper with signatures by committee members on the GS-24 Report of Final Examination Result (no later than Week 11 of your graduating term)
✓ Incorporate committee’s recommendations into the Professional Research Paper
✓ Deliver final copies per Department and Graduate School requirements (no later than Week 11 of your graduating term)
✓ Submit journal/proceedings article with your advisor
✓ Obtain signatures on Department Requirements Form (before the end of the semester)
✓ Graduate!