



**Concrete Industry Management
Concrete Course Descriptions**

CIM 1010 Introduction to the Concrete Industry

1 credit

Prerequisite: None

CIM1010 provides an overview of the history, career opportunities, job functions, and professional organizations in the concrete industry. Students will be introduced to the Concrete Industry Management curriculum, its instructional expectations and methodologies.

Topics will include:

- objectives of the Concrete Industry Management program
- overview of the concrete industry
- history of the concrete industry
- overview of concrete, cement, aggregate and admixture properties and uses
- concrete production and uses
- concrete construction and contracting
- professionalism and opportunities for CIM students and graduates
- professionalism in the concrete industry

CIM 1050 Blueprint Reading

1 credit

Prerequisite: None

This course provides a broad-based background in interpreting blueprints. Typical plans for both residential and commercial building will be reviewed.

Topics will include:

- dimensioning, plot plans, foundation plans, elevations, floor plans, details
- mechanical, electrical, civil, structural, and architectural plans
- specifications

CIM 3000 Fundamentals of Concrete: Properties and Testing

4 credits (includes lab)

Corequisite: CIM 1010

CIM3000 examines effects of concrete-making materials (aggregates, cements, admixtures, etc.) on the properties of fresh and hardened concrete. Concrete mixture proportioning calculations and statistical analysis of strength tests are also studied.

Topics will include:

- aggregate properties and testing (grading, specific gravity, absorption, moisture content, abrasion resistance, soundness, harmful substances)
- cement properties and testing (chemical composition, fineness, setting time, soundness, strength)
- supplementary cementing materials (fly ash, silica fume, blast-furnace slag)
- admixtures (air-entraining agents, water reducers, accelerators, retarders)

- fresh concrete properties and testing (workability, slump, air content, unit weight)
- hardened concrete properties and testing (strength, durability, volume changes, permeability)
- concrete mix proportioning (normal strength, high strength, and special mixes)
- statistical analysis of concrete strength tests
- ACI Level I Field Testing Certification

CIM 3050 Concrete Construction Methods

3 credits

Prerequisite: CIM 3000

CIM3050 covers forming, shoring, placing and reinforcing operations. Transporting, placing, consolidating, finishing, jointing and curing concrete for cast-in-place foundations, pavements, slabs on ground, structural frames, and other structural members are studied. Other topics include waterproofing concrete foundations and erecting precast concrete members.

Topics will include:

- forming and shoring materials and methods
- reinforcing materials and methods
- transporting concrete (pumps, conveyors, crane and bucket)
- placing concrete (avoiding segregation)
- hot and cold weather concreting
- consolidating concrete (vibrating screeds, immersion vibrators, external vibrators)
- finishing concrete (tools and methods)
- jointing (grooved, sawed, and formed joints – timing, spacing, and joint depth)
- curing methods
- erecting precast and pre-stressed concrete members (crane operations, planning)
- waterproofing foundations (materials and methods)
- ACI Flatwork/Finisher Certification

CIM 3060 Understanding the Concrete Construction System

3 credits

Prerequisites: CIM 3000 & Statistics

CIM3060 takes a detailed look at how the concrete construction industry works. The course includes a review of model building codes, building officials and their function, concrete industry codes and standards, concrete construction processes, quality assurance systems, contract documents, estimating, construction scheduling and concrete construction markets.

Topics will include:

- model building codes
- concrete industry codes and standards
- concrete quality assurance systems (project)
- job specifications
- the bidding process
- contracts, bonds, insurance
- construction scheduling
- concrete construction estimating
- construction safety
- associated topics

CIM 3070 Site Planning, Layout, and Preparation

3 credits**Corequisite: CIM 3050**

CIM3070 involves the various activities required to successfully prepare a site for concrete work. These include initial site investigation, surveying, groundwork, subbase preparation, and elevations. In addition, students will be exposed to modern technological tools and methods, such as the use of GPS, EDM, and lasers.

Topics will include:

- initial site investigation
- land surveying methods
- excavation and backfill
- subgrade preparation
- elevations
- form choice and setup
- squareness of forms
- location of embedments
- field practice using tools and techniques discussed

CIM 3080 Formwork Design and Computerized Drafting**3 credits****Prerequisite: CIM 3050**

CIM3080 provides foundational understanding of economics and safety with regard to formwork selection, design, and construction. In addition, students will review the various forming systems available and how they may be integrated for use in specific project circumstances. This course will include a basic review of CAD drafting techniques and their application.

Topics will include:

- labor and materials in formwork economics
- safety in formwork design and construction
- commercially available forming systems
- formwork design and integration
- introduction to CAD
- application of CAD in formwork design and construction layout

CIM 3100 Applications of Concrete in Construction**3 credits****Prerequisite: CIM 3050**

CIM3100 is a detailed study of the many uses of concrete in the construction of buildings, pavements and other facilities. Emphasis will be placed on the advantages, disadvantages, and unique problems faced by materials suppliers, contractors and design professionals when concrete is chosen for specific applications.

Topics will include:

- pavements (construction methods, repair, rehabilitation, life-cycle costing)
- residential construction (decorative flatwork, basements, foundations, block, ICF's)
- commercial construction (block, cast-in-place, pre-cast, pre-stressed, and architectural concrete)
- underground systems (septic, pipe, culverts, etc.)
- concrete estimating methods and software (project)
- concrete repair methods and materials
- special topics (mass work, underwater placements, etc.)

CIM 3200 Concrete Project Estimating

3 credits

Prerequisite: CIM 3100

CIM3200 involves using project drawings to prepare both basic and detailed estimates. Activities include practice implementing the printreading, estimating and other skills acquired using actual sets of finished drawings. Projects will become more complicated as the semester progresses, and will include below-grade, flatwork, and above-grade examples.

Topics will include:

- blueprint reading
- project general conditions and specifications
- quantity take-offs
- estimating and bidding
- foundations and basements
- parking lots and roadways
- flat slab and tilt-up
- above grade floors and walls
- unique projects (dams, tunnels, skyscrapers, parking garages, etc.)

CIM 3300 Concrete Industry Internship

2 credits

Prerequisites: CIM 3050 & Junior Standing

CIM3300 provides an opportunity for students to gain supervised, practical work experience in their particular field of interest within the concrete industry. The student will be evaluated by his/her supervisor, and a final report will be submitted by the student detailing the internship experience.

Possible experiences may include:

- concrete production management in ready mix, block, pipe, or precast/prestressed facilities
- sales internship for a concrete company or concrete materials or equipment supplier
- construction management internship for a specialty concrete or general contractor
- other opportunities at the discretion of the supervising faculty and program director

CIM 4010 Design and Construction Issues

3 credits

Prerequisite: CIM 3200

CIM4010 involves a review of concrete construction materials and their physical and mechanical properties. Special emphasis will be placed on the concepts of mechanics of materials and resolving design/construction mismatches.

Topics will include:

- review of concrete properties, admixture effects, and mix designs
- reinforcement type and placement
- properties of materials
- statics principles
- deflection and loading
- stress and strain
- subgrade and base materials
- modern trends

- design & construction conflicts

CIM 4030 Issues in the Concrete and Construction Industry: A Legal and Ethical Perspective

3 credits

Prerequisite: CIM 3060 Corequisite: BLAW 3400

CIM4350 involves a case study approach to critically analyze various historical and current events in the concrete and construction industry. Particular emphasis will be placed upon developing a managerial decision-making process incorporating ethical, legal, financial and other business perspectives.

CIM 4050 Management of Concrete Products: Ordering and Delivering

3 credits

Prerequisites: CIM 3100 & ET 3910

This course is designed to provide the student with a basic understanding of managing the order and delivery process common to all concrete products. Emphasis will be on planning, organizing and controlling at both the first-line supervisory and managerial levels. The study of the key differences in the order and delivery function of ready mix concrete, concrete masonry, precast concrete, prestress concrete and concrete pipe will be supplemented by product-specific guest lectures and plant tours.

Topics will include:

- order department personnel selection and training
- computer-aided order scheduling
- computer-aided order processing
- computerized truck tracking
- driver selection and training
- operation of delivery equipment
- delivery equipment maintenance
- safety and regulatory compliance
- product quality control
- developing annual operating and capital budgets
- tracking and control of delivery cost
- work environment and company image

CIM 4060 Management of Concrete Products: Production Facilities

3 credits

Prerequisites: CIM 4050 & ET 3910

The course is designed to provide the student with a basic understanding of managing the manufacturing process common to all concrete products production facilities. Emphasis will be on planning, organizing and controlling at both the first-line supervisory and managerial levels. A review of key differences in the manufacturing process of ready mix concrete, concrete masonry, precast concrete, prestress concrete and concrete pipe will be explained through product-specific guest lectures and plant tours.

Topics will include:

- facilities components review (electrical, electronics, hydraulics, conveyors, scales, front-end loaders, fork lifts, bins, silos, pollution control equipment, etc.)
- forecasting and procuring raw material requirements
- raw material and finished product inventory control
- production planning

- preventive maintenance of equipment and machinery
- computerized measurement and weighing of materials
- safety and environmental regulatory compliance (project)
- work environment and company image
- tracking and controlling production costs
- developing annual operating and capital budget requirements
- Preparation for PCI QC Certification Levels I and II

CIM 4070 Concrete Contracting Personnel Management

3 credits

Prerequisite: Senior Standing

CIM4070 involves application of personnel management techniques in the contracting business. Emphasis will be placed on adapting management styles to various employee personality traits, training techniques, personal management, effective and efficient management of equipment and other resources, and leadership development.

Topics will include:

- personality types/profiles
- personal behaviors
- communications
- training
- time management
- resource management
- productivity
- financial statements
- leadership

CIM 4100 Field Management and Supervision

3 credits

Prerequisite: Senior Standing

CIM4100 involves the required knowledge and skills to effectively manage the concrete construction jobsite activities. Emphasis will be placed on safety, equipment identification and use, maintenance and contingency plans, and worksite productivity.

Topics will include:

- pre-pour meetings and checklists
- time and motion studies
- 30 hour OSHA safety course
- equipment and tools (identification, applications, safe operation, and maintenance)

CIM 4150 Concrete Problems: Diagnosis, Prevention and Dispute Resolution

3 credits

Prerequisites: CIM 3100 & Senior Standing

CIM4150 involves diagnosing and preventing problems related to concrete production, testing, construction and performance. Students learn to identify causes of fresh and hardened concrete problems, such as fast and slow setting, air content variations, low strength, cracking and scaling. Pre-job conferences and dispute resolution methods are examined.

Topics will include:

- fresh concrete problems (fast set, slow set, false set, variable air content, slump loss, excessive bleeding, blistering, cement-admixture incompatibility, segregation, poor pumpability or finishability, low yield)
- hardened concrete problems (scaling, low strength, alkali-silica reaction, cracking, aggregate popouts, slab curling, water-vapor transmission, rebar corrosion)
- testing methods (coring, impact hammer, penetration testing, sonic testing)
- problem prevention and resolution (quality control, pre-job conferences, dispute resolution methods)
- case studies and role-playing

CIM 4200 Senior Concrete Lab

2 credits

Corequisites: CIM 4150 & Senior Standing

CIM4200 provides students an opportunity to further develop their technical and laboratory knowledge and pursue a project of individual interest. A formal report/presentation will be required at the conclusion of the course.

Topics will include:

- advanced laboratory testing and field evaluation techniques
- individually guided project(s)
- ACI Level I Lab Certification

CIM 4910 Capstone

3 credits

Prerequisite: Graduating Seniors Only

CIM491 is an intensive study of a problem(s) appropriate to the major and the student's career interests, and will require knowledge from the student's previous technical and business coursework. Solution(s) for the problem(s) will be presented to a committee of concrete industry representatives. Presentation must emphasize depth of analysis, completeness and effectiveness of solution, and presentation skills.