

**Common Course Outline**  
**CONT 106**  
**Construction Materials and Methods**  
**3 Semester Hours**

**The Community College of Baltimore County**

**Description**

**Construction Materials and Methods**

Studies the basic construction materials and methods from a practical standpoint; introduces the Construction Management Technology curriculum including use and application of concrete, masonry, wood products, steel, bituminous materials, finishes, paints, site investigation and preparation, job layout, foundations, floor and wall structures, and roof systems.

3 credits: 3 lecture hours per week.

**Overall Course Objectives**

Upon completion of this course the student will be able to:

**Introduction to the Building Process**

- Describe and discuss the factors that influence building projects

Who	The Project Team
Why	Need, Financial Constraints, Objectives
What	Planned Need
Where	Zoning, Site Conditions
How	Building Codes
  
- Describe the needs and benefits of Building Codes and Standards.
- Identify the three principal building codes used in the United States.
- Describe the concept and identification of Building Use groups.
- Describe the concept and identification of Building Construction Types.
- Describe the concept of Fire Rating.
- Describe how the material selection and construction details define construction type, which can control and restrict building use.

**Soils**

- Knowing how a particular soil will behave helps us design for and use it efficiently in the building process.
- Describe and appreciate the ability of different soils to behave differently.
- Describe the differences in soil particulate size.
- Describe the concept of moisture content.
- Describe the concept of plasticity.

- Describe the concept of permeability.
- The concept of maximum soil density/compaction, proctor curves.

### **Site Work**

- Describe the considerations of site design.
- Describe the role and functions of storm water management.
- Describe the principles of site grading, haul, borrow, and balanced site.
- Describe the concepts and principles of sediment and erosion control.
- Describe the basic principles and variations of pavement design.
- Describe the basic material and construction concepts of bituminous concrete.
- Describe the variations and similarities in civil site utility design and construction.  
(water, sewer storm drain)

### **Foundations**

- Describe the reasons and techniques for sheeting an excavation.
- Discuss the principles of cofferdams and tiebacks.
- Describe the role of groundwater in foundations and excavations.
- Recognize the applications and installation of shallow foundations.
- Recognize the applications and installation of deep foundations.
- Explain the process of installing caisson foundations.
- Explain the mechanics of driving piles.
- Recognize the variation in pile design and materials.
- Describe the use and limitations on retaining walls.
- Identify and explain the design elements of retaining walls.
- Explain the role and variations in waterproofing and damp proofing.

### **Timber**

- Describe the variations in wood properties and species.
- Explain the manufacturing, sawing, seasoning, and sizing of lumber.
- Describe and explain the impacts of natural defects and shrinkage in the grading and performance of lumber.
- Discuss the variations in wood products.
- Describe the manufacture and grading of plywood.
- Discuss the role and application of wood preservatives.
- Describe the variation and use of wood fasteners.
- Discuss the advantages and use of heavy timber construction.
- Discuss the evolution of light frame construction.

### **Masonry**

- Describe the historic, architectural, and aesthetic appeal of masonry.
- Explain the role and composition of mortar.
- Describe and explain the manufacture and variations in clay brick, concrete block, cut stone, and glass block.
- Describe the importance of dimensioning, layout, and coursing in masonry.
- Explain common construction details and practices such as leads, lentils, corbels, and expansion joints.

- Describe the function and design of cavity walls.
- Discuss the use of exterior insulated finish systems (EIFS) and siding as alternatives to masonry veneers.

### **Structural Metals**

- Describe the concept of metal alloys and how they modify/improve the behavior of base metals.
- Explain the process of making steel.
- Explain the process of making aluminum.
- Describe the working of metals.
- Discuss the nomenclature for the designation/classification/variation of structural shapes and products.
- Describe the shop drawing/fabrication process.
- Describe the variations and role of structural connectors.
- Discuss field erection and inspection practices.

### **Concrete**

- Describe the basic composition of Portland Cement Concrete.
- Outline the history and manufacture of Portland Cement.
- Describe the manufacture of aggregates.
- Describe the importance of mix proportioning and the water to cement ratio.
- Discuss the use and role of admixtures.
- Explain the difference between Quality Assurance and Quality Control QA/QC.
- Describe the process of hydration of cement.
- Discuss the issues of workmanship, placement, and performance problems with concrete construction.
- Discuss the differences and benefits of both Site-cast and Pre-cast concrete construction.
- Discuss the differences and benefits of both Prestressed and Post Tensioned concrete construction.
- Describe the role, design, and placement of reinforcing steel.

### **Roofing**

- Define the components of a roofing system.
- Describe the properties of insulation.
- Describe the role of vapor barrier and the relationship between humidity, temperature, and condensation (dew).
- Describe the role of venting and roof soffits.
- Discuss the differences between low slope and steep slope roofs.
- Describe the importance of drainage and membranes on low slope roofs.
- Describe the role of shingles and membranes on steep roofs.
- Describe the requirements of building codes for roofs.

### **Glass and Glazing**

- Outline the history of glass and the glass manufacturing process.
- Outline different glass types and their uses.

- Describe the performance properties of glass as it relates to the transmission of light/sound/temperature.
- Describe the design concerns of large light glazing systems.
- Discuss the requirements of the building code on glass and glazing.

### **Building Services**

- Describe the need for Building Services (water/wastewater, electric, sprinkler, phone, computer, HVAC).
- Describe the role of Heating/Ventilation/Air Conditioning (HVAC).
- Discuss HVAC design elements and issues.
- Describe the design elements and issues with fire suppression systems.
- Discuss electrical service and distribution.
- Discuss water/wastewater service distribution/collection and venting.
- Discuss the use of elevators.

### **Interior Finishes**

- Describe the tenant fit-out/finish process.
- Outline the issues and concerns involved in the selection of interior finishes.
- Discuss how the building codes influence the selection of interior finishes.
- Explain the benefits and installation of drywall.
- Discuss the properties and selections of paint systems.
- Discuss the properties and selection of flooring.

### **Major Topics**

Introduction to the Building Process  
Soils  
Site Work  
Foundations  
Timber  
Masonry  
Structural Metals  
Concrete  
Roofing  
Glass and Glazing  
Building Services  
Interior Finishes

### **Course Requirements**

Grading/exams: Grading procedures will be determined by the individual faculty member and will include at least 4 out of the 7 categories that follow:

Homework  
Projects  
Mid term  
Term paper/oral report  
Classwork  
Team project  
Quizzes  
Final exam

There will be a minimum of 8 graded assignments

Writing: The individual faculty member will determine specific writing assignments.

**Other Course Information**

This course is a   X   core course and a \_\_\_\_\_ elective.

This course is taught in a computerized environment. No

This course is the first course in a required two-course sequence. No

Individual faculty members may include additional course objectives, major topics, and other course requirements to the minimum expectations stated in the Common Course Outline.

Date Revised: 08/22/00