

**ITCM 403 – Construction Methods and Materials II
SYLLABUS – SPRING 2007**

Department of Industrial and Engineering Technology
College of Science and Technology
Morehead State University



Course Description: ITCM 403 - Construction Methods and Materials II, (3-0-3), II. Prerequisites: ITCM 203 or consent of instructor. A continuation of ITCM 203, this course is a study of the technical and management methods in construction techniques, with concentration on heavy or horizontal construction. Topics include excavation methods, equipment requirements, types, selection and scheduling, commercial high explosives, blasting pattern design, and legal/safety considerations.

Instructor: Dr. Charles Patrick, Professor, P.E., C.S.I.T.
Office - 209 Lloyd Cassity, 783-2884 (office), 784-4452 (home), 776-2274 (cell)

Online Information:

E-mail: c.patrick@moreheadstate.edu Web: <http://www.cpatrick.info/>

- **IMPORTANT:** You **MUST ELECTRONICALLY ENROLL** for the class online at <http://moreheadstate.blackboard.com/>.
- Enrolling on Blackboard for ITCM 403 is **NOT** optional and **MUST** be completed immediately.
- Login to Blackboard at <http://moreheadstate.blackboard.com/>, find ITCM 403, and click **Enroll**.
- Once enrolled, access the course online and click **Student Tools**, then **Personal Information**, then **Edit Personal Information** to update your email address and other information.

Tentative Course Outline:

<u>Week</u>	<u>Topic</u>
1	Course Requirements, Heavy - horizontal construction
2	Excavation Sequence, Exploration Techniques
3	Volumetric Methods, Cuts and Fills
4	Volumetric Methods, Cuts and Fills
5	Equipment Selection - General
6	Equipment Productivity - Cycle Times
7	Equipment Fleet Selection
8	Midterm Exam
9	Reclamation Methods, Drilling and Blasting
10	Spring Break (No Classes Mar. 19-23)
11	Explosive Properties, Types, Characteristics, Products
12	Initiating Systems and Priming
13	Surface Layout and Patterns
14	Blast Casting, Cost Analysis
15	Controlled Blasting, Vibration, Air Blast
16	Research Report Presentations
17	Final Exam - May 9, 2007

Course Competencies:

Upon successful course completion, the student will have gained the following competencies:

1. Understand soil classification systems for planning, development data, and excavation method implementation **(evaluated in assignment #1, midterm exam, and portfolio)**.
 - Understand various soils and classification methods with engineering applications.
 - Explain the excavation and load bearing characteristics of various soils.
2. Perform volumetric analyses and overburden cut/fill computations **(evaluated in assignments #2 and 3, midterm exam, and portfolio)**.
 - Understand and perform average end area computations.
 - Understand and perform computations of overburden volumes from contour maps.
3. Understand the types and applications of equipment used for surface excavation **(evaluated in midterm exam and portfolio)**.
 - Understand the types of equipment used and their applications.
 - Compare equipment types as applied in heavy construction.
4. Perform equipment productivity analyses **(evaluated in assignments #4 and 5, midterm exam, and portfolio)**.
 - Understand equipment cycle time and productivity components.
 - Compute productivity rates for various types of surface excavation equipment.
5. Demonstrate an understanding of the erosion control and reclamation processes used in construction **(evaluated in final exam and portfolio)**.
 - Explain the basic sequence used for reclaiming land disturbed from construction.
 - Explain the soil stabilization methods used for reclaiming disturbed land.
6. Understand the basic mechanisms of rock fragmentation by explosives analyses **(evaluated in assignment #6, final exam, and portfolio)**.
 - Explain how the detonation front in a high explosive travels and its boundaries.
 - Understand the four stages of rock breakage resulting from high explosives blasting.
7. Understand explosive classifications and physical/performance properties of explosives **(evaluated in assignment #7, final exam, and portfolio)**.
 - Explain commercial uses of low and high explosives, blasting agents, and initiators.
 - Explain detonation zone, ingredients, critical diameter, sensitivity, water resistance, density, strength, and detonation velocity/pressure.
 - Understand blast vibration and air blast hazards and analysis.
8. Demonstrate an understanding of explosive initiation systems **(evaluated in assignment #8, final exam, and portfolio)**.
 - Describe the design and use of non-electric initiation systems.
 - Understand the use and need for delaying initiators for high explosives.
9. Understand blasting design, layout, and analysis methods **(evaluated in assignments #9 and 10, final exam, and portfolio)**.
 - Layout a delay sequence pattern for surface blasting.
 - Understand blasthole priming methods used in surface excavation blasting.
 - Explain the application of blast casting and controlled blasting for highwall stability.
10. Develop a written report including a synopsis, appraisal, and a statement of application to course content of two scientific journal articles and orally present the report to the class **(evaluated in research assignment and portfolio)**.

Textbook, Reading Assignments:

Text: Nunnally, S.W. (2006). Construction Methods and Management. 7th Edition. Upper Saddle River, NJ: Pearson Prentice Hall. [Same textbook used in ITCM 203]

Readings/ Resources:

- *Internet:* Highway Building Careers, Building Design Management, Modern Construction Handbook, Construction Planning, ACI Materials.
- *Journals:* Better Roads, Road Construction and Safety, Construction Equipment Magazine, Construction Contractor, Engineering News Record, Highways.
- Course notes – available on Blackboard in PowerPoint presentation files and handouts distributed to students throughout semester. A standard 3-ring binder is required to maintain the course notes (approximately 150 pages).

<u>Grading:</u>	Mid-Term Exam	125 points
	Final Exam	150 points
	Assignments	100 points
	Research Report and Presentation	100 points
	Portfolio	<u>25 points</u>
	Total	500 points

Assignments: Students will be assigned out-of-class weekly or bi-weekly writing and/or analytical work. This work should be written or typed legibly on white paper or green engineering pads appropriate for senior-level technology courses. Assignments must be submitted on the due date at the beginning of class. No late assignments will be accepted. However, a student can submit any assignment at the next class attended after an absence with a documented excuse for the due date of the assignment.

Grading assignments and exams: All written assessment (other than research report) will be graded and returned to students within one week of submission. Written feedback will be provided to students in the form of completed rubrics or handwritten comments on assessment items (i.e. papers, assignments, reports, exams). When returned, students are encouraged to ask for a review of any graded work, if it is felt the grade received was not appropriate or accurate. Within one week of receiving the graded assignment, the work in question must be returned by the student with a written or oral statement of explanation. This statement must be justified and supported by lecture notes, textbook, or other material from class. The final decision for the grade on all student assessment items is the responsibility of the class instructor.

Report and Presentation: This research assignment is to review, summarize, compare, and present to the class two scientific journal articles relevant to this class. Details of the requirements for this assignment are provided on a separate document.

Portfolio: A portfolio must be maintained containing notes, assignments, reports, and all other class materials. This portfolio must be maintained within a 3-ring binder (min. 1.5" spine), fronted with a table of contents, and be appropriately divided with tabs to identify sections as described. The portfolio must be updated throughout the semester and will be graded during the Final Exam.

Attendance: Perfect and punctual attendance is expected. A role will be taken at the beginning of each class. Consistent tardiness is unacceptable; three occurrences of a student arriving late for class will equate to one absence. The following attendance bonus/penalty plan will apply to all students:

- NO absences (excused or unexcused) – 10 bonus points added to student’s final course score.
- One absence (excused or unexcused) – final course score is unaffected by absences.
- Two absences (excused or unexcused) – 30 points deducted from student’s final score.
- Three absences (excused or unexcused) – 75 points deducted from student’s final score.
- Four or more absences (excused or unexcused) – any student absent from class four or more times during the semester will receive a failing grade of “E” regardless of other scores.

The instructor retains the option to vary this attendance policy under extenuating circumstances.

Disruptive or distracting behavior: Disruptive or distracting behavior of any type is not allowed in class. This includes talking (excluding class discussion, of course), reading newspapers, snoring, etc. Students that disrupt the class may be asked to leave. Regarding late arrivals to class, consistent late arrivals are considered a serious disruption to the class. The instructor will maintain a written record of late arriving students. After a student accumulates three (3) late arrivals, the instructor will ask the student to leave the classroom for all other class sessions in which the student arrives late.

Cell phones and pagers: The use of cellular phones and pagers has become common. The operation of a cell phone and pagers during a university class is likely to disrupt the class. Therefore, **all cell phones and pagers must either be turned off or set to a silent mode of operation (e.g., vibrating rather than beeping) during class.** If you must answer a call, please quietly leave the classroom. Students whose phones disrupt the course will be asked to verbally apologize to the entire class and will be required to leave the class for the remainder of that session. The class instructor may approve an exception for special circumstances, based on a student request prior to class session.



Academic honesty: Cheating, fabrication, plagiarism or helping others to commit these acts will **not** be tolerated. Academic dishonesty will result in severe disciplinary action including, but not limited to, failure of the student assessment item or course, and/or dismissal from MSU. If you are not sure what constitutes academic dishonesty, read The Eagle: Student Handbook or ask me. The policy is located at:

<http://www.morehead-st.edu/units/studentlife/handbook/academicdishonesty.htm>

Note: Copying information from the Internet is plagiarism if appropriate credit is not given.

Policy for Accommodating Students with Disabilities: In compliance with the Americans with Disabilities Act (ADA), all qualified students enrolled in this course are entitled to reasonable accommodations. It is the student’s responsibility to inform the instructor of any special needs before the end of the second week of class.