Syllabus for CET1141 - Fundamentals of Cemented Aggregate Mixtures

General Information

Course Title - Fundamentals of Cemented Aggregate Mixtures
Course Number - CET1141
Credits - 4 credits
Class Hours - 42 hours (3 hours per week)
Laboratory Hours - 42 hours (3 hours per week)
Prerequisite Courses - None

Professor - Larry Sutter
Room 232 EERC Building
487-2268
llsutter@mtu.edu
Office Hours: By Arrangement

Course Outcomes - This course introduces cemented aggregate mixtures and standardized field and laboratory tests to verify properties of these materials. This information is fundamental to any person solving civil engineering or construction problems requiring a knowledge of construction materials.

Course Description - Introduce the fundamentals of aggregates, asphalt and portland cement concrete construction materials including physical properties, testing, and placing. Students receive certification as an ACI Level I Concrete Technician and as an MDOT Certified Aggregate Technician.

Textbooks - "Design and Control of Concrete Mixtures"
Steven H. Kosmatka and William C. Panarese
Portland Cement Association, 1988

- "Compilation of ASTM Standards Relating to Concrete"
National Ready Mixed Concrete Association
NRMCA Publication Number 187

Computer Usage - Moderate - Must use a word processor to prepare reports, spreadsheets for calculations and plotting data, and e-mail program for communicating with the Professor and other students.

Calculus Usage - None

Library usage - Minimal - As needed by the student
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Grading

Attendance/Participation - Recommended
20 Points Overall

Communication Skills
Required
Students will be asked to write lab reports and write paragraphs as part of the quizzes and examinations.
10 Points Overall

Quizzes and Homework - Quizzes lasting approximately 20 minutes will be given in class as appropriate. Approximately 1 homework assignment (average) will be collected for grading each week. A quiz or homework assignment is weighted for significance by the total possible number of points allotted for the individual assignment.
25 Points Overall

Hour Examinations - 3 - One (1) hour examinations.
25 Points Overall

Final Examination - Comprehensive
20 Points Overall

Laboratory - Students will become certified as MDOT Aggregate Technicians and ACI Level 1 Concrete Technicians. The student will receive a lab grade in large part determined by the written exam for concrete certification, written exam for aggregate certification, and practical exams for both concrete and aggregate certification. Participation will also be considered for laboratory grades.
100 Points Overall

Lab Point Breakdown
20 lab points Concrete Written Certification Exam
20 lab points Concrete Practical Certification Exam
20 lab points Aggregate Written Certification Exam
20 lab points Aggregate Practical Certification Exam
20 lab points Lab Participation

Overall Grading
200 point system / Converted to Percent Overall via a straight curve
Note: Straight curve means 100%-95%=A, 94%-90%=AB, 89%-85%=B, 84%-80%=BC, 79%-75%=C, 74%-70%=CD, 69%-65%=D, below 65%=F. All fractional values of Overall Grade rounded up.

Late Assignments
All late assignments will have 10% deducted for each day late. No assignments accepted after 7 calendar days.
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**Grading cont.**

#### Example Calculation

**Quizzes and Homework**  
| Homework    | Grade  
|-------------|--------
| Homework 1  | 5/5    
| Homework 2  | 6/10   
| Homework 3  | 9/10   
| Homework 4  | 8/10   
| Homework 5  | 9/10   
| Homework 6  | 8/10   
| Homework 7  | 7/10   
| Homework 8  | 14/20  
| Homework 9  | 8/10   
| Homework 10 | 9/10   
| Homework 11 | 7/10   
| Homework 12 | 9/10   
| Quiz 1      | 8/10   
| Quiz 2      | 0/20   
| Quiz 3      | 8/10   

**Quiz/Homework Grade** = $\frac{115}{165} = 69.7\% = 17.4$ overall points

**Examinations**  
| Exam       | Grade  
|------------|--------
| Exam 1     | 94\%   
| Exam 2     | 89\%   
| Exam 3     | 88\%   

**Examination Ave.** = $89.7\% = 22.4$ overall points

**Final Examination**  
| Final      | Grade  
|------------|--------
| 81\%       | 16.2 points 

**Class Participation**  
| Class Participation | Grade  
|----------------------|--------
| 100\%                | 20.0 points 

*Based upon instructor review, and as applicable, peer review.*

**Communication**  
| Communication | Grade  
|---------------|--------
| 90\%          | 9.0 points 

**Laboratory**  
| Laboratory    | Grade  
|---------------|--------
| Concrete Written Certification Exam | 80\% =18 points 
| Concrete Practical Certification Exam | 80\% =17 points 
| Aggregate Written Certification Exam | 80\% =16.5 points 
| Aggregate Practical Certification Exam | 80\% =16 points 
| Overall Lab Participation | 90\% =17 points 

**Overall Lab Participation** = $84.5$ of $100$ possible points = $84.5/100 =84.5\% = 84.5$ points

**Overall Grade**  
| Overall Grade | Grade  
|---------------|--------
| 169.5 of 200 possible points = $\frac{169.5}{200} =84.8\% = B$  

**Grading cont.**
Cheating and Plagiarism

Anyone engaging in activities deemed to constitute cheating or plagiarism will be given an F in the course and turned over to the Dean of Students for disciplinary action consistent with the Code of Student Conduct and University Policies.

Unless otherwise instructed in writing by the Professor, all students are expected to do their own

MTU complies with all federal and state laws and regulations regarding discrimination, including the Americans with Disabilities Act of 1990 (ADA).

If you have a disability and need reasonable accommodation for equal access to education or services, please contact the Dean of Students Office for assistance. For other concerns about discrimination, you may contact your advisor, department head, or the Affirmative Action Office.
## Syllabus for CET1141 - Fundamentals of Cemented Aggregate Mixtures

<table>
<thead>
<tr>
<th>Week</th>
<th>Recitation</th>
<th>Laboratory</th>
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</table>
| 1    | Introduction  
Aggregate Properties  
Aggregate Geology | Weighing, Sampling, Loss by Wash |
| 2    | Gradation  
Aggregate Characterization | Sieve Analysis  
Introduce Deleterious Picks |
| 3    | Aggregate Specifications | Deleterious Picks, Consensus Properties |
| 4    | Aggregate Technician Certification Requirements | Specific Gravity Determination, Color Tests |
| 5    | Portland Cement Production  
Cement Hydration | Aggregate Certification Testing |
| 6    | Required Aggregate Properties  
Materials Related Distress in Concrete Admixtures | Mixing concrete, Introduce ASTM Level I Training - Slump, Temperature |
| 7    | Hardened Concrete Properties  
Concrete Testing | Continue ASTM Level I Training - Unit Weight Determination, Air Content |
| 8    | Placing & Finishing  
Introduction to Asphalt | Continue ASTM Level I Training - Air Content |
| 9    | Required Aggregate Properties | ASTM Level I Testing |
| 10   | Binder properties  
Binder Characterization | Binder characterization |
| 11   | Introduction to Mix Design Methods  
Asphalt Pavement Properties | Mixing asphalt, aggregate gradations |
| 12   | Asphalt Production | Mixing asphalt, aggregate gradations |
| 13   | Asphalt Placement | Marshall Testing |
| 14   | Introduction to Superpave | Superpave Demonstration |