

## **CT 231: Bituminous Concrete Technology (3 Credits)**

### **Course Description**

This course covers the materials, design, placement, and testing procedures of freshly mixed and hardened bituminous and concrete mixes; along with an overview of maintenance and rehabilitation practices that are used in typical highway and heavy construction projects.

### **Textbooks and Software and Other Materials**

#### **REQUIRED TEXTBOOKS**

Prentice Hall, Highway Materials, Soils and Concretes, 4th ed. Harold N. Atkins. 2003

The Asphalt Institute, Principles of Construction of Hot-Mix Pavements

#### **REFERENCE MATERIALS**

American Concrete Institute Concrete Field Testing Technician Grade, I

Technician Workbook Publication CP-1 (06) (reference material only)

MN/DOT Concrete and Bituminous Manuals (reference material only)

NDDOT Field Sampling and Testing Manual (reference material only)

ASTM Standard Methods. (reference material only)

AASHTO Standard Methods (reference material only)

Other equipment: Scanner or access to fax machine

Software: Microsoft Word is needed for all online classes. If additional software is needed for a particular course, it will be indicated in the online course schedule. The Civil Technology program also requires Microsoft Office 2003 or newer.

Contact Coleen at the NDSCS Bookstore for the most current textbook information (1-800-342-4325, ext. 2239 or [coleen.thoe@ndscs.nodak.edu](mailto:coleen.thoe@ndscs.nodak.edu)). You may also visit the Bookstore web site at <http://www.ndscsbooks.com/> and search for book information by class by clicking the "Textbook" tab.

### **Technology Required**

Email: Students taking online classes from NDSCS also need a working email account. Be sure email address is updated in student record in PeopleSoft system.

Internet Access required. High speed Internet service is highly recommended. If students are unable to get high speed service, an alternate site may be needed to view some of the course components.

## Course Objectives

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

- Recognize hazardous nature of hot asphalt cement.
- Observe safety issues.
- Describe the origin and history of asphalt.
- Describe the refining process of asphalt.
- Compare various methods for liquefaction of asphalt.
- Define the grading process for asphalt.
- Describe proper sampling techniques for asphalt.
- Describe and perform basic lab and field test for asphalts.
- Describe production of cold-mix asphalt.
- Describe sub grade and base preparation for asphalt paving.
- Identify equipment on asphalt paving train.
- Describe production of hot-mix asphalt.
- Compare different types of asphalt production plants.
- Describe deficiencies of hot-mix asphalt
- Describe compaction techniques for asphalt paving.
- Calculate paving quantities.
- Identify surface defects
- Identify appropriate maintenance/rehabilitation methods
- Prepare asphalt mix design.
- Explain properties, manufacture and types of Portland cement.
- Explain properties of aggregates used in concrete production.
- Explain properties and qualities desired for mixing water.
- Explain procedures and benefits of air entrainment
- Explain accepted concrete admixtures
- Explain mixing and placing procedures for Portland Cement Concrete
- Explain finishing and curing procedures for Portland Cement Concrete
- Identify placement and finishing tools for Portland Cement Concrete
- Develop a concrete mix design
- Mix laboratory batches of concrete
- Compute trial mix calculations for Portland Cement Concrete
- Perform the following testing procedure in accordance with ACI standards:
  - \* *C1064 Temperature*
  - \* *C172 Sampling Procedures*
  - \* *C143 Slump testing*
  - \* *C138 Unit weight and yield*
  - \* *C231 Air content-pressure method*
  - \* *C173 Air content-volumetric method*
  - \* *C31 Casting and curing cylinders*
- Obtain American Concrete Field Technician Grade I certification
- Perform laboratory compression tests

## Tie to Program Assessment Outcomes

This class will support the student's ability to solve industry related design and estimating problems and become knowledgeable of the rapidly changing technology currently taking place in the engineering and surveying field.

## Assignments

Assignments and quizzes within each chapter are due within specified time frames. Refer to the Schedule for specific due dates.

Assignments not completed by the specified deadline but submitted late will have 10% of grade points deducted at instructor's discretion.

No points will be assigned for incomplete assignments. Be prepared to spend at least four (4) hours per week in the online class, studying, and completing assignments.

*Online Discussions:* The online discussions are required activities, and full participation is essential for your success of this course. These discussions are an equivalent to the traditional classroom discussions. You are expected to read all postings, and interact with each other. Refer to the specific Discussion expectations under Discussion Grading Criteria.

*Online Student Participation and Conduct Guidelines:* The practices of courtesy and respect that apply in the traditional classroom also apply online. However, the expectations and practice differ in the online classroom to greater extent. Review and print the [Online Student Participation and Conduct Guidelines](#) to learn of these expectations.

## Submitting Assignments

All assignments should be turned in via Dropbox unless otherwise specified. You are strongly encouraged to make hard copies of your assignments and communications with the instructor to avoid losing data in the case of technical issues. At the first sign of problems, contact your Internet Service Provider (ISP) immediately.

It is your responsibility to access the class on another computer in the event of hardware or software problems. If your problems are not cleared up within 12 hours, contact the instructor by telephone to make other arrangements.

## Grading

All assignments and quizzes will be graded the week following the due date. If assignments are late, they will be graded at my convenience and subject to the deduction of points.

Average percentages will be converted to a letter grade according to the following scale:

50%=Assigned problems and worksheets

50%=Unit Tests, Midterm, and Final Test

## Grading Scale

**A**=94-100

**B**=85-93

**C**=70-84

**D**=60-69

**F**=0-59

## Discussion Grading Criteria

You are expected to respond to discussion questions and to two of your classmates as assigned. Each posting must be relevant and substantive (at least 75 words in length.) Responses to classmates must also be relevant and substantive (more than "I agree.") Your first entry is expected by Wednesday each week. Check back into the Discussion to respond to your classmates by Saturday. You will be graded on participation according to the following:

*Each week is worth 10 points*

<b>Online- Threaded Discussion Participation</b>			
Unsatisfactory 0 points	Needs Work 2 points	Satisfactory 3 points	Very Good 5 points
Less than 3 postings are made in the discussion board area.	<p>3-5 entries: Each entry is posted but is brief (less than two sentences)</p> <p>a) It has little in the way of thoughtful, substantive ideas concerning the assignment and/or course content related to it.</p> <p>AND/OR</p> <p>b) It fails to respond to fellow student(s) or in response to a fellow student it is quite simple and just a personal remark not a substantive reply (ex- "Good. I really liked your comment.)</p>	<p>3-5 entries: Each entry has 3 or more sentences:</p> <p>a) Each contains thoughtful, substantive ideas concerning assignment and/or course content related to it;</p> <p>AND/OR</p> <p>b) The entries are responsive to at least two other classmates with detailed remarks about that individual's writing or discussion response.</p>	<p>3-5 entries: Each entry includes one or both characteristics in the 7 points box plus:</p> <p>a) Entries include an outside resource, or a relevant, specific real life application;</p> <p>AND/OR</p> <p>b) Your response to class member(s) clearly indicates your position in relation to what fellow students(s) said or wrote (e.g. - agreeing, disagreeing, adding to, modifying, extending or questioning it.)</p>

## Special Activities

A one week lab session that is held on the NDSCS Campus is required to complete this course. During this time you'll experience the hands-on component of the class where the testing methods addressed in the units will be covered.

Guest housing is available on campus with all bedding provided at a rate of \$10/night. Guest apartments are fully furnished with bedding and equipped for cooking at \$25/night. Contact Residential Life at 701-671-2224 for reservations.

Also, check out the Wahpeton area hotels for your stay in the area.

Temporary parking permits are required and can be purchased at the Campus Police located in Hektner Hall. The rate is \$1.00/day.

## **Work Expectations**

Students should estimate approximately three hours of course work per credit per week for NDSCS classes. For example, a three-credit class may require approximately nine hours of work time a week for the student. This amount may vary by class and by student.

## **Policies and Procedures**

NDSCS online students should be aware of various policies and procedures such as those shown below.

*Attendance* - Students are expected to log into their online classes frequently during each week of the semester and to submit course work on time to meet due dates set by the instructors. Attendance and class participation is monitored and students not submitting work in their online classes may be dropped from the class. Review the [Attendance Policy](#) for further details.

*Computer Access* - It is the student's responsibility to maintain access to a working computer and Internet connection to keep up in online class assignments. Because computer problems do occur, students should have a plan for alternative computer access in case of computer problems. Students will be able to access their online classes from any computer with an Internet connection. Review the [Computer Access Policy](#) for further details.

## **Refund Policy/Withdrawal Refund Schedule**

*Academic Calendar* - Online classes follow the same calendar as regular on-campus classes. They begin with the semester begins and students do not need to log in at specific days/times but instructors do set due dates for assignments and exams to be submitted so there is structure to the classes. Online classes are not self-paced but do provide flexibility in that they are accessible 24/7 to allow students to work around other commitments when doing their course work. Review the [Academic Calendar](#) for further details.

*Academic Integrity* - Integrity is an NDSCS core value and there is an expectation that all students, as members of the college community, adhere to the highest levels of academic integrity.

Dishonesty in class, laboratory, shop work or tests is regarded as a serious offense and is subject to disciplinary action by the instructor and dean of the respective division. For more information, refer to the NDSCS Student Planner or College Catalog under [College Policies and Basic Regulations of Conduct](#).

## **Types of Misconduct**

**Cheating:** Intentionally using or attempting to use unauthorized materials, information, or study aids in any academic exercise.

**Fabrication:** Intentionally and unauthorized falsification or invention of any information or citation in an academic exercise.

**Facilitating academic dishonesty:** Intentionally or knowingly helping or attempting to help another to commit an act of academic dishonesty.

**Plagiarism:** Intentionally or knowingly representing the words or ideas of another as one's own in any academic exercise.

### **Disabilities and Special Needs**

If you have a disability for which you are or may be requesting an accommodation, you are encouraged to contact both your instructor and the Disability Support Services Office, 225 Mildred Johnson Library (phone 701-671-2623, 800-342-4325, ext. 32623) as early as possible in the term.

Other College Policies can be found in the [NDSCS Catalog](#).

### **Student-Instructor Communications**

While an online class is available 24 hours a day and offers greater flexibility for the student and instructor, keep in mind that your instructor will not be available 24 hours a day. I will check my email, voicemail, and Cyber Office messages on a regular basis, but there may be times when I am unavailable due to other commitments and job responsibilities. I will respond to email, voicemail, or Cyber Office messages as time allows. As a general rule, you can expect your direct question to be answered within 24 hours during week days.

When sending an email, please include your full name so I know to whom I'm responding. Often, the email address does not indicate who is sending the message.

### **Exams**

Exams are done online. Instructors may require a proctor be present for online exams. When the semester begins, check your course information for the proctor form and proctor criteria.

### **Schedule**

Online classes follow the same academic calendar for start and end dates as regular on-campus classes. While there is no set time for students to be logged into a class each day, instructors do set due dates for assignments and exams. Students should log into classes frequently to keep up with announcements and to keep up with course work. Online classes are not self-paced.

You may want to print the for NDSCS [Academic Calendar](#) reference during the year. It includes semester start and end dates, final days to add/drop classes for each semester, vacation dates, etc.

### **Tuition/Fees**

See tuition and fee information, Refund Policy and Withdrawal Schedule information in the [NDSCS Online site](#) under Financial Information. Tuition and fee costs do not include books, software, supplies and other program or course fees which may vary by program.

## ONLINE STUDENT PARTICIPATION AND CONDUCT GUIDELINES

Online courses are based on the premise that students learn best in a community. The instructor plays an important role, but this is a different role than most instructors play in the traditional, face-to-face classroom. While you may see a shift in the way classes work, you'll also notice that some things don't change: the practices of courtesy and respect that apply in the ordinary classroom also apply online, and may actually require more attention in this venue. Here are some guidelines:

1. **Get involved.** In the online environment, it's not enough to show up! Your voice must be heard in order to show your presence. Your comments are needed to add to the information, the shared learning, and the sense of community in each class.
2. **Be persistent.** Remember that for many this is a fairly new environment. Each instructor still sets the rules, and you need to abide by them; however, if you run into any difficulties, don't wait! Send your instructor an email immediately or post in the Discussion Area. Most problems are easily solved, but your instructor and your fellow students need to hear from you before they can help.
3. **Share tips, helps, and questions.** For many, taking online courses is a new experience. There are no dumb questions, and even if you think your solution is obvious, please share it by posting it in the Discussion Area. For every student who asks a question, there are 10 others wanting to know the same thing.
4. **Think before you push the *Send* button.** Did you say just what you meant? How will the person on the other end read the words? While you can't anticipate all reactions, do read over what you've written before you send it.
5. **Consider the context.** Remember that we can't see the grin on your face when you make a sarcastic comment, we can't see the concern on your face if you only say a couple of words, and we can't read your mind and fill in the gaps if you abbreviate your comments. So: help us "see" you by explaining your ideas fully.
6. **Ask for feedback.** Not sure how your ideas and comments will be taken? Remember there's a person on the other side. If you disagree with what someone has said, practice all your communication skills as you express that disagreement. "Flaming," or flying off the handle and ranting at someone is unacceptable; it is the equivalent of having a tantrum, something most of us wouldn't do in an onsite, face to face classroom.
7. **Act with respect.** Any discriminatory, derogatory or inappropriate comments are unacceptable and subject to the same disciplinary action that they would receive if they occurred in the face to face classroom. If you have concerns about something that has been said, please contact your instructor.
8. **Exercise integrity.** Plagiarism, cheating, and other violations of ethical student behavior are serious actions in a learning community. See Academic Integrity Policy in the course syllabus.
9. **Recognize the consequences.** Consequences of online student behavior that contradicts the NDSCS Academic Integrity policy will be addressed on an individual basis and in accordance with NDSCS Academic Integrity policy. Refer to the NDSCS Student Planner or College Catalog for more information.

\*Adapted with permission from Dr. C. A. Keller, San Antonio College