Course Objectives: To present theoretical and practical aspects of unit operations for water treatment with design applications. Topics include water characteristics and contaminants, coagulation, flocculation, sedimentation, filtration, adsorption, ion exchange, disinfection and disinfection by-products, and management of water treatment residuals. Laboratory procedures: water characteristics, coagulation/flocculation, filtration, and adsorption

Course Instructor: Dr. Onita Basu (ME 2366)
Email contact: onita.basu@carleton.ca
Office Hours: Mondays 10 – 11 am

Course Lectures: Mon, Wed 8:35 pm to 9:55 am (TB 240)
Course Labs: Monday 2:35 to 5:35 pm (Minto 1040): Section 2
Friday 11:35 am to 2:25 pm (Minto 1040): Section 1
CoursePA: Tuesday 1:35 pm to 2:25 pm (TB 447)

Teaching Assistant: tba
Email: tba

Text:
Course Notes – on CULEARN

Grading:

Lab Reports = 15%
Assignments = 20%
Midterm = 20%
Final Exam = 45%

Assignments are to be submitted in groups of 2 or 3 (no individual submissions).

The TA will provide details additional details on all labs and assignments during the tutorial period.
Topics to be covered in this course:

- Intro to Water Treatment
- Water Quality Characteristics/Water Demand
- Coagulation and Flocculation
- Sedimentation
- Filtration
- Adsorption
- Ion Exchange/Softening
- Water Disinfection
- Water Residuals

Reference Books: (Suggested but not limited to)

1. Author/Publisher: Hendricks, David
   Title: Water Treatment Unit Processes: physical and chemical.
   Call Number: TD430 .H46 2006
   Year: 2006

2. Author/Publisher: Montgomery Hill Watson (MWH)
   Title: Water Treatment: Principles and Design.
   Call Number: TD 430.W375 2005
   Year: 2005

3. Author/Publisher: Sanghi, Rashmi; Sharma, Sanjay Kumar, PhD
   Title: Water treatment and pollution prevention
   Call Number: online e-text book
   Year: 2012

4. Author/Publisher: American Water Works Association (AWWA)
   Title: Water Treatment Plant Design
   Call Number: TD 434.W38 2005
   Year: 2004

Please note: it is expected that you will supplement your course notes by referencing the books above or other similar material.

Additional Notes:
Information (lecture material, lab notes, etc) for the course will be posted on WebCT.

What happens if an assignment/lab is late? You will receive a 10% deduction from the overall mark for the first day. You will receive a mark of zero after that. No exceptions

What happens if I miss the Midterm? You will receive a mark of zero if you do not discuss with the instructor before hand. Doctors Notes are required to reschedule.

Following faculty practice, the final examination papers will not be returned after marking.
A minimum mark of 45% on the final exam is required to pass the course.

Lab Comments:
- Lab coats are required.
- Labs are biweekly.
- Lab groups will be selected by the instructor and/or course TA. You may provide suggestions on who you wish to work with but it not guaranteed.
- Attendance in the Lab is Mandatory – there are five labs in total. If you are more than 10 minutes late you will lose 10% off that lab mark. If you are later than 30 minutes you will be marked as absent and considered as not in attendance for that lab.
- Missing more than one lab will result in an FND for the course.
- Lab reports are expected to include the following sections: Introduction/Theory, Methods and Materials, Results, Discussion, and Conclusion. For some labs, data between groups will be pooled for analysis. Certain labs with an in-class testing component. Labs must be typed. Poorly constructed labs will be rejected.

Requests for Academic Accommodations for Students with Disabilities:
The Paul Menton Centre for Students with Disabilities (PMC) provides services to students with Learning Disabilities (LD), psychiatric/mental health disabilities, Attention Deficit Hyperactivity Disorder (ADHD), Autism Spectrum Disorders (ASD), chronic medical conditions, and impairments in mobility, hearing, and vision. If you have a disability requiring academic accommodations in this course, please contact PMC at 613-520-6608 or pmc@carleton.ca for a formal evaluation. If you are already registered with the PMC, contact your PMC coordinator to send me your Letter of Accommodation at the beginning of the term, and no later than two weeks before the first in-class scheduled test or exam requiring accommodation (if applicable). Requests made within two weeks will be reviewed on a case-by-case basis. After requesting accommodation from PMC, meet with me to ensure accommodation arrangements are made. Please consult the PMC website (www.carleton.ca/pmc) for the deadline to request accommodations for the formally-scheduled exam (if applicable).

Requests for Academic Accommodation for Religious Obligations
Students requesting academic accommodation on the basis of religious obligation should make a formal, written request to their instructors for alternate dates and/or means of satisfying academic requirements. Such requests should be made during the first two weeks of class, or as soon as possible after the need for accommodation is known to exist, but no later than two weeks before the compulsory event. Accommodation is to be worked out directly and on an individual basis between the student and the instructor(s) involved. Instructors will make accommodations in a way that avoids academic disadvantage to the student.

Requests for Academic Accommodation for Pregnancy:
Pregnant students requiring academic accommodations are encouraged to contact an Equity Advisor in Equity Services to complete a *letter of accommodation*. The student must then make an appointment to discuss her needs with the instructor at least two weeks prior to the first academic event in which it is anticipated the accommodation will be required.