Homework principles

1. *Working together and sharing ideas/results with your classmates are allowed and encouraged.*
2. *Directly copying your classmates' homework in parts or whole is not allowed.*
3. *When the homework involves computer programming, you can submit your program(s) for review while it is optional and not required (see the instruction below).*
4. ***The grading of HWs is not entirely based on getting the "correct answer" but also the effort and thoughts you put in.***

How to submit

Please type your homework results using a text editing program and embed the figures. When it's completed please produce a pdf file. Figures will need a caption and will have to be explained in the text. **Email your homework to Daoxun Sun,** sdxmonkey@gatecgh.edu, as a single zip file containing the PDF documents and all the MATLAB scripts (or whatever software/programming language).

Please **use always this type of naming convention:**
HW1_FirstnameLastname.[pdf/zip]

Please also use the **subject of the email** to be the same as the file name such as:
To: sdxmonkey@gatech.edu
Subject: HW1_FirstnameLastname

EAS 4305/6305 Physics and Chemistry of the Oceans
Homework #1: Due before class, Thu 8/30/2016.

Tracer profiles from the subtropical North Pacific and North Atlantic

The goal of this homework is to experience getting oceanographic dataset from ocean time series stations.

(1) Please make sure you have access to MATLAB.

- Matlab is now available for installation by GT students on their personal machines. For more information, visit **http://matlab.gatech.edu**
- You can also run MATLAB using a virtual machine using your web browser and visiting **mycloud.gatech.edu**
- You can also use the **EAS computer lab** at L1110 of the EST building. The door code is 4+5, 1, 3. Press 4 and 5 at the same time, then 1, then 3 – turn the knob.

(2) Go visit the HOT website (HOT, http://hahana.soest.hawaii.edu/hot/hot_jgofs.html). Spend a few minutes to learn about the project. Then go to the data download site, called HOT-DOGS. Choose "Data Extraction" from the top menu and choose "Bottle". Then download potential temperature (θ), bottle salinity (S), bottle dissolved oxygen (O_2) and nitrate (NO_3). It can be downloaded in text or netCDF format.

(3) Start MATLAB and import the data. If you haven't done this before, here is one of the ways to do it. First, save the netCDF file in the folder where you do homework. Use `ncdisp('filename.nc');` to examine the contents of the netCDF file. Then, `var = ncread('filename.nc','varname');` to read the variable.

(4) Missing data is labeled as -9 in this particular dataset. First filter out the missing data, and then plot each of the data (T, S, O_2, NO_3) as a function of pressure (dbar). Reverse the y-axis (so pressure increases downward in the plot) and include axis labels. Sample MATLAB scripts will be available on the github site.

(5) Plot near-surface (<10dbar) T and O_2 as a function of time from Year 2005 to 2015. For the time axis, convert date (mmddyy) into decimal year. Briefly describe how surface T and O_2 vary seasonally.

(6) **Extra credit** Repeat step (4-5) for the Bermuda Ocean Time Series (BATS, http://bats.bios.edu). Their FTP site directly provides data files in text and Excel format (http://batsftp.bios.edu/BATS/bottle/). Download bats_bottle file which includes (T, S, O_2, NO_3, NO_2). On the **Home** tab, in the **Variable** section, select **Import Data**. This will open a new graphical interface to select which data to read.