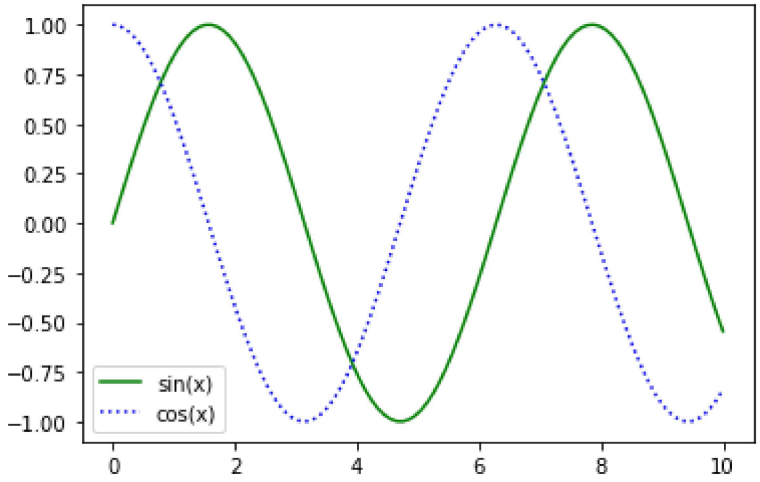
Assignment 0

At the start of this course, I understand machine learning to be the use of training algorithms to explore patterns in data and to exploit those patterns in order to classify or predict new data.

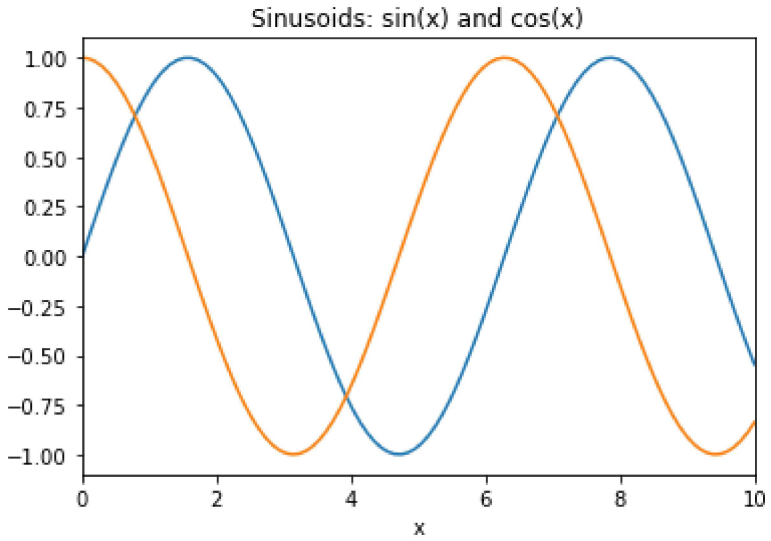
In [1]:
```
import numpy as np
import matplotlib.pyplot as plt
```

In [2]:
```
x = np.linspace(0, 10, 100);
plt.plot(x, np.sin(x), '-g', label='sin(x)')
plt.plot(x, np.cos(x), ':b', label='cos(x)')

plt.legend();
```



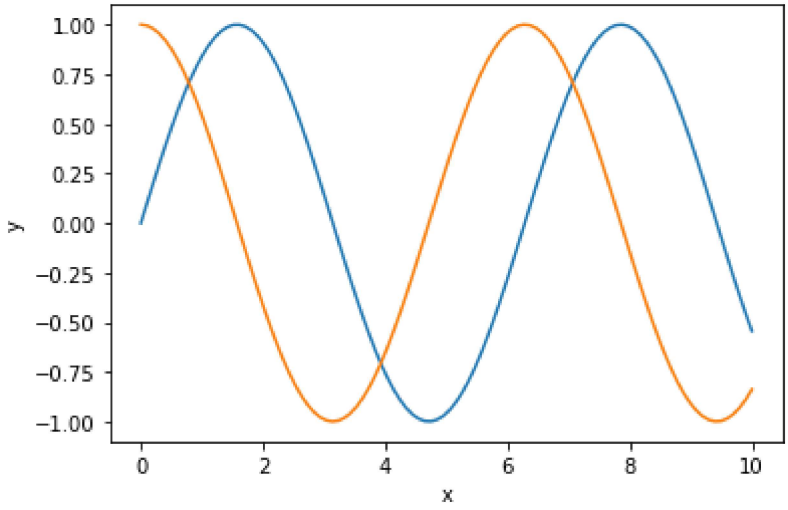
To set x-lim, x-label, and title properties of the axes, use the *set()* method

In [3]:
```
ax = plt.axes()
x = np.linspace(0, 10, 100);

ax.plot(x, np.sin(x))
ax.plot(x, np.cos(x))
ax.set(xlim=(0, 10),
       xlabel='x',
       title='Sinusoids: sin(x) and cos(x)');
```



Similarly, for only axes titles, use the *set()* method

In [4]:
```
ax = plt.axes()
x = np.linspace(0, 10, 100);

ax.plot(x, np.sin(x))
ax.plot(x, np.cos(x))
ax.set(xlabel='x', ylabel='y');
```



Course Policies

The communication channels available in this course are:

1. Canvas discussion board - the primary means to get help with a problem, other than office hours
2. Email - catiaspsilva@ece.ufl.edu for questions about grades
3. Telephone (352.392.6502), talk with me during office hours, or set up an appointment.
4. Slack page for the course. This is an optional resource for students to discuss the course amongst each other and with the Professor. This resource is intended to supplement office

hours and student interactions. No official communication/submission happens over Slack. No assignments submissions will be accepted over Slack.

Late assignments:

Submissions are accepted until the assignment solutions are posted but will lose the “on-time” points listed in the rubric.

Re-grading:

If you feel that any graded assignment needs to be re-graded, you must discuss this with the instructor within one week of grades being posted for that assignment. If approved, the entire assignment will be subject to complete evaluation.

Healthy collaboration includes:

- discussing and explaining general course material
- discussing assignments for better understanding
- aiding for general programming and debugging issues

If another student contributes substantially to your understanding of a problem, you should cite this student to raise awareness of the similar interpretations of a problem.

Prerequisites

1.

$f(x) = \frac{1}{2}\phi(wx + b)$ and $\phi(x) = x^2$

If we let $u = wx + b$

$\frac{\partial f}{\partial x} = \frac{\partial f}{\partial \phi}\frac{\partial \phi}{\partial u}\frac{\partial u}{\partial x} = (\frac{1}{2})(2u)(w) = w(wx + b)$

2.

If a system of linear equations has more equations than parameters, it may be described by a matrix with more rows than columns. At least of the rows will be linearly dependent and therefore add no new information to the system. Solving the row-reduced system should retain the properties of the original system.

3.

The second central moment of a random variable is its variance: $Var(X) = E(X^2) - (E(X))^2$, where $E(X)$ is the Expected value or mean of the random variable X. The covariance of X and Y is $Cov(X, Y) = E(XY) - \mu_x\mu_y$, or the correlation minus the product of the means. This can be thought of as the central moment of the two random variables. If X and Y are independent, $E(XY) = E(X)E(Y) = \mu_x\mu_y$ and $Cov(X, Y) = 0$. Then, the two random variables are uncorrelated.

In [ ]: