WHAT IS THIS COURSE ABOUT?
Hyatt Regency Wall Collapse

- Date: July 17th, 1981
- killed 114, and 214 injured

https://en.wikipedia.org/wiki/Hyatt_Regency_walkway_collapse
NEWTONS LAWS
Newtons 1st Law:
An object at rest stays at rest and an object in motion stays in motion with the same speed and in the same direction unless acted upon by an unbalanced force.
Newtons 2\textsuperscript{nd} Law:
When the sum of forces acting on a particle is not zero, the sum of the forces is equal to the rate of change of linear momentum of the particle. If the mass is constant, the sum of the forces is equal to product of mass of the particle and its acceleration.

http://www.pixton.com/schools/gallery/n3bxfa4u
Newton's 3rd Law:
For every action, there is an equal and opposite reaction. The forces exerted by two particles on each other are equal in magnitude and opposite in direction.
SI UNITS - WHY?

THE REASON WHY AMERICA STILL USES THE IMPERIAL SYSTEM

IS TO CONFUSE THE REST OF THE WORLD

ACRE
The amount of land that a farmer with a single ox could plow in one day

FOOT
The 12-inch foot of King Henry I of England during the early 12th century

ORIGINS OF AMERICAN UNITS OF MEASUREMENT

GALLON
Based on a "wine gallon," which corresponded to a vessel that held eight troy pounds of wine

HORSEPOWER
Compared the output of steam engines to the power of horses
NASA MARS CLIMATE ORBITER

- Date: September 23rd 1999.
- Lockheed Martin which was performing the calculations was sending thruster data in English units to NASA while NASA navigation team was expecting metric units.
- Loss: $125 million

http://www.cnn.com/TECH/space/9909/30/mars.metric.02/
A KEY FEATURE OF SI UNITS: PREFIXES VARYING IN MULTIPLES OF 10

<table>
<thead>
<tr>
<th>Prefix</th>
<th>Abbreviation</th>
<th>Multiple</th>
</tr>
</thead>
<tbody>
<tr>
<td>nano-</td>
<td>n</td>
<td>$10^{-9}$</td>
</tr>
<tr>
<td>milli-</td>
<td>m</td>
<td>$10^{-3}$</td>
</tr>
<tr>
<td>killo-</td>
<td>k</td>
<td>$10^3$</td>
</tr>
<tr>
<td>Item of measurement</td>
<td>SI</td>
<td>US Customary</td>
</tr>
<tr>
<td>----------------------</td>
<td>----------</td>
<td>--------------</td>
</tr>
<tr>
<td>Length</td>
<td>meters</td>
<td>feet</td>
</tr>
<tr>
<td>Mass</td>
<td>Kilogram</td>
<td>pounds</td>
</tr>
<tr>
<td>Time</td>
<td>Seconds</td>
<td>Seconds</td>
</tr>
</tbody>
</table>
Newtonian Gravitation:
Newton’s law of universal gravitation states that any two bodies in the universe attract each other with a force that is directly proportional to the product of their masses and inversely proportional to the square of the distance between them.

\[ F_g = \frac{G M m}{d^2} \]

where G is the universal gravitational constant.