Florida Atlantic University
College of Engineering & Computer Science

Technology Enhanced Learning For Delivering Mechanical Engineering Courses

Chaouki Ghenai, Ph.D.

Ocean/Mechanical Engineering Department

Teaching With Technology Showcase - October 24, 2009

Technology Enhanced Learning:

Integrates education and information technologies into academic environment.

Used to optimize and enhance students learning

Allows for interactive environment that maximize learning by challenging the students to be creative.

Helps faculty, student and staff to explore and implement technologies for delivering courses on campus and distance learning.

Technology Enhanced Learning:

1. Florida Engineering Education Delivery System (FEEDS)
2. Citrix Systems
3. Web based Simulation
4. Black Board
5. Digital Pad

TEL – Florida Engineering Education Delivery System (FEEDS):

- Delivering graduate and undergraduate engineering courses to students over the internet
- Mechanical Engineering Courses:

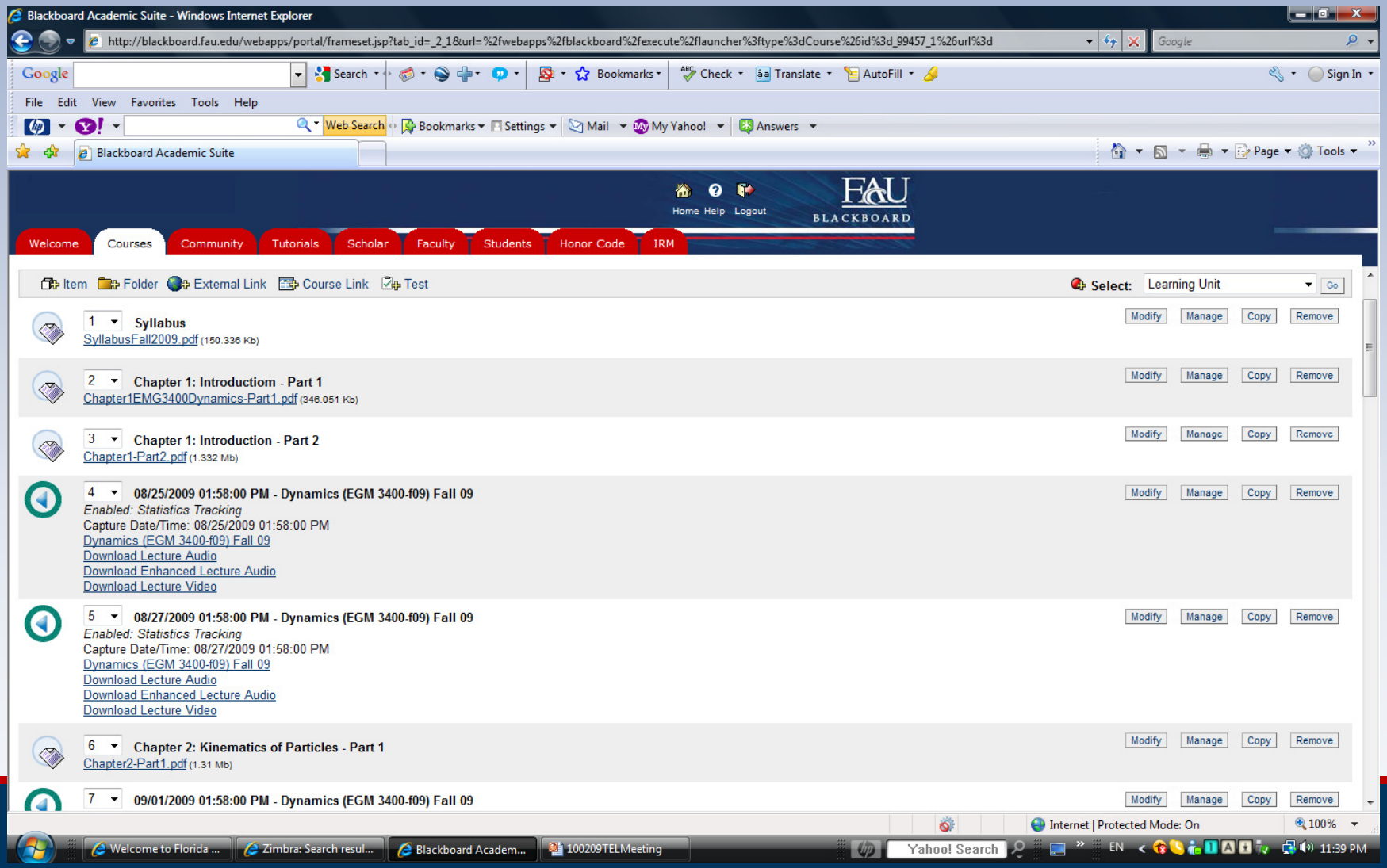
  Dynamics/ Statics/ Thermodynamics/ Heat Transfer/ Fluid Mechanics/ Computational Fluid Dynamics/ Applied Combustion

TEL – Florida Engineering Education Delivery System (FEEDS):

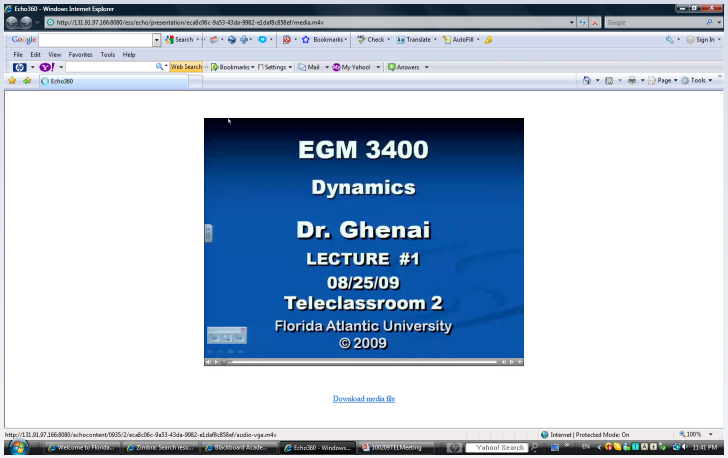
- Lectures can be viewed by streaming video after the on-campus lecture has finished.
- With streaming video, students have the convenience of accessing their course anywhere with a computer that has Windows Media Player 10 and a high-speed Internet connection

FLORIDA ATLANTIC UNIVERSITY

TEL – FEEDS (Streaming Video in Black Board)



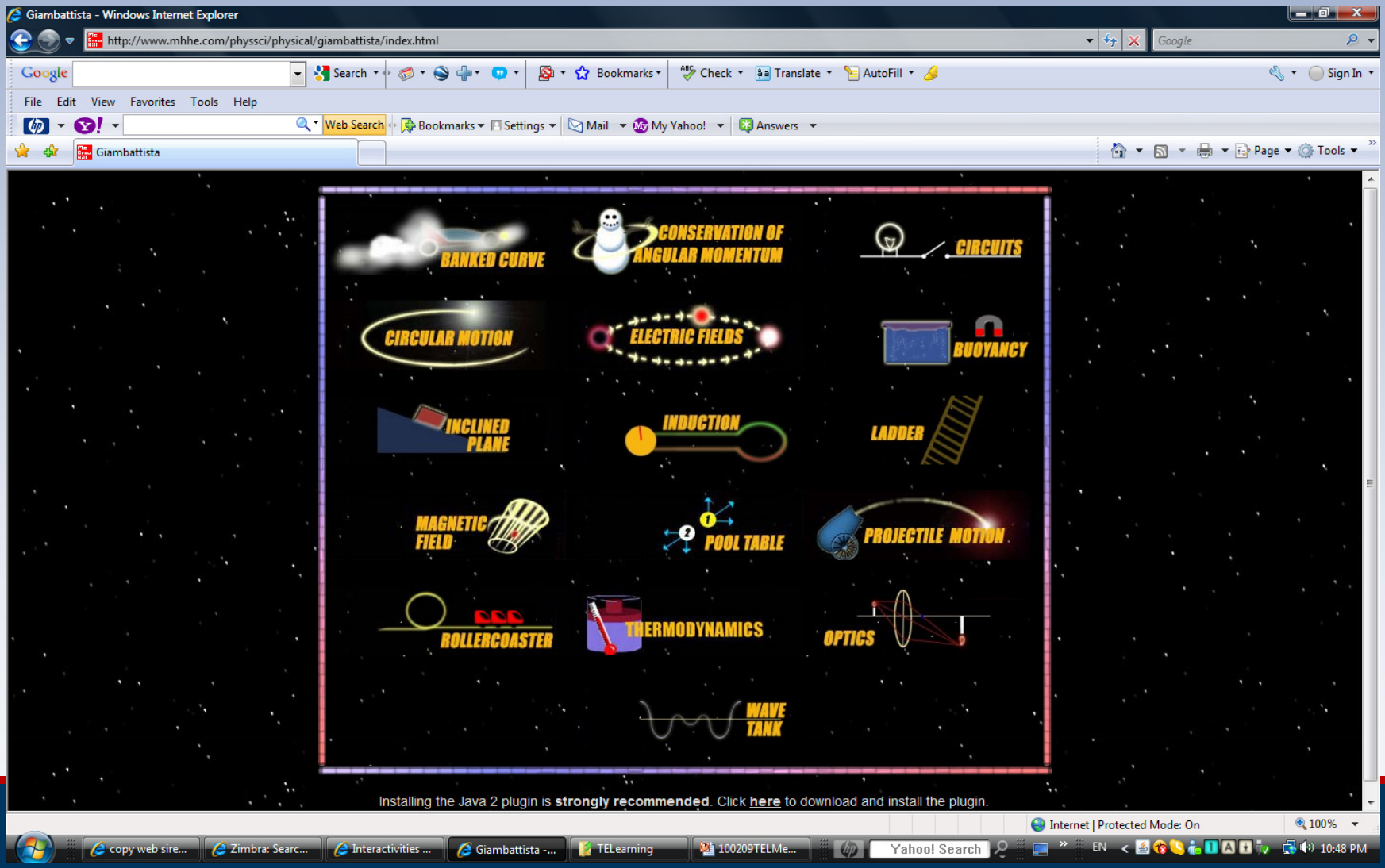
TEL – FEEDS (Computer Center)



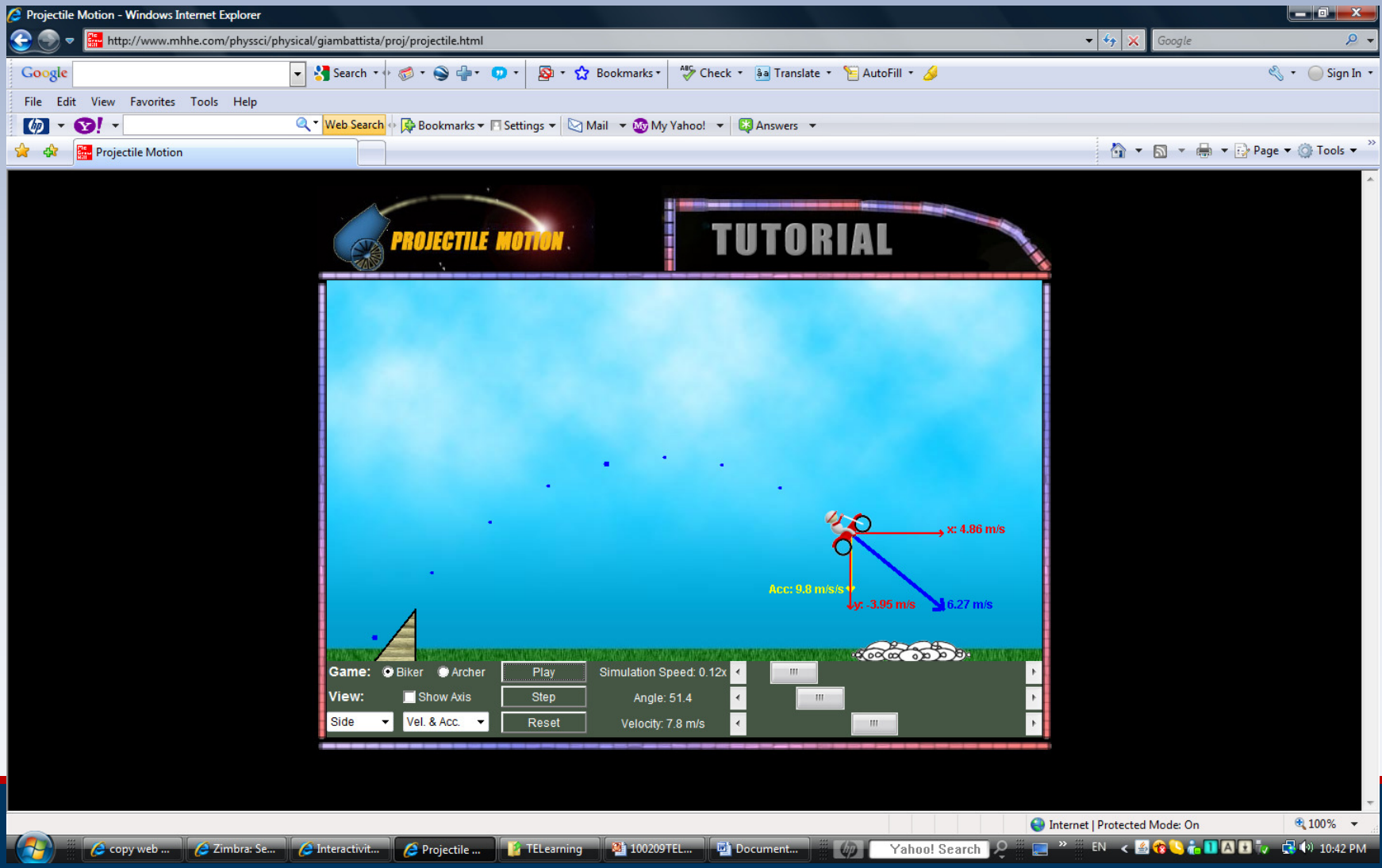
TEL – Web-Based Simulation and Visualization (WBSV):

- Interactive modules that use Web-based simulation and visualization (WBSV) are also used to enhance the student learning.
- WBSV are used in ME courses (Dynamics, Fluid Mechanics and Computational Fluid Dynamics) to complement student learning achieved through physical laboratories and conventional classroom instruction

Course Wide Content – Interactivities



Interactivities: Projectile Motion – Biker



TEL - Citrix System:

- Citrix System is used for delivering information technology (IT) solutions that enhance and expand the educational experience for mechanical engineering students.
- Citrix Systems is used for visualization and remote access software for delivering applications over a network and the internet.

TEL - Citrix System:

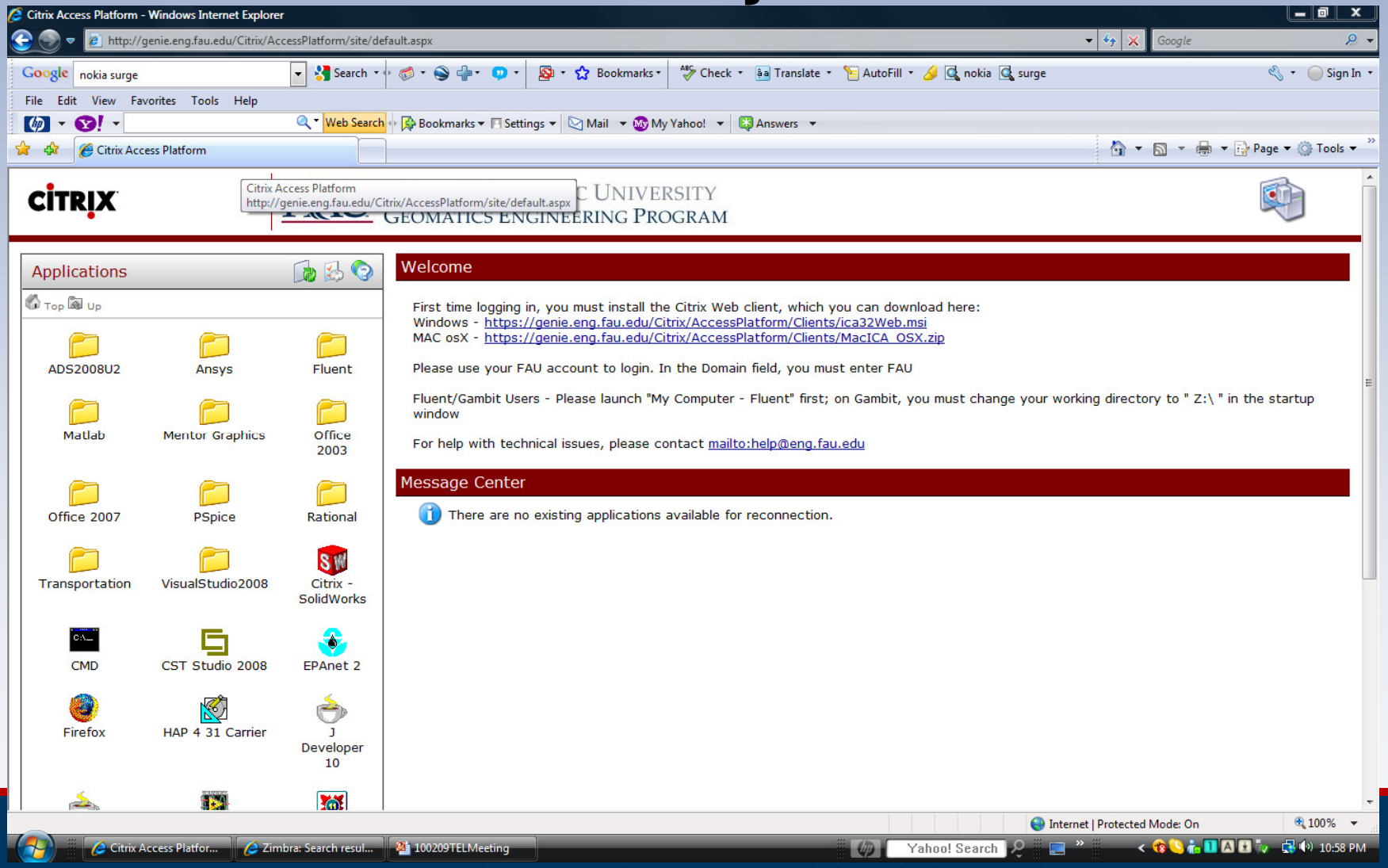
- Software such as Matlab, Ansys, Fluent, Visual Studio, Solid Works, Labview, and Maple are available through Citrix system for interactive classroom.
- Citrix System is also used by students on campus (laptop classroom) and off campus to remotely access and run software without having the software loaded onto their personal computers.

TEL - Citrix System:

- GoToMeeting: Online courses that feature two-way audio and video interactions between students and the instructor.
- Another advantage is the ability for students to remotely access and run professional grade software without having the software loaded onto their personal computers.
- The software product that permits this type of operation is Citrix's Presentation Server

FLORIDA ATLANTIC UNIVERSITY

TEL - Citrix System



TEL - Citrix System – Matlab

Part A

File Edit View Go Debug Desktop Window Help

Location: file:///Z:/html/CAProjectSpring2009.html

Part A

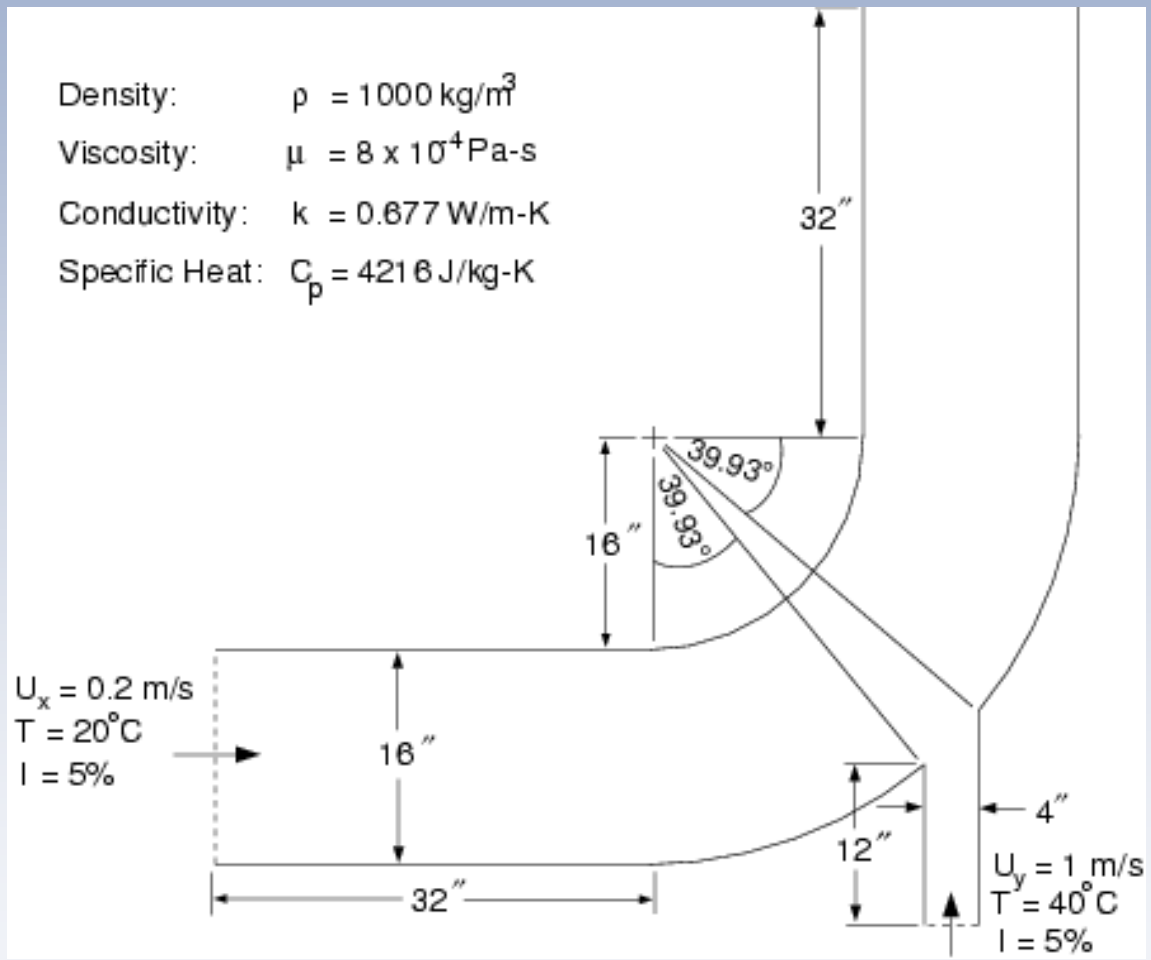
radius of the cranckshaft

```
r = 4;   % inches
% the length of the psiton rod
b=6;     % inches
% number if rotation per minutes
omega=5000;   % rpm
% time
t=linspace(0,1/5000,300);   % minutes

%position
s = r*cos(2*pi*omega*t)+ sqrt(b^2-r^2*(sin(2*pi*omega*t).^2));   % inches
plot(t,s), xlabel ('time, min'), ylabel('Position, inch')

%velocity
v1= -2*r*sin(2*pi*omega*t)*pi*omega;
v2= 2*r^2*sin(2*pi*omega*t).*(cos(2*pi*omega*t)*pi*omega);
v3=sqrt(b^2-r^2*(sin(2*pi*omega*t).^2));
v = v1-v2./v3;   % inches/minutes
figure
plot(t,v), xlabel ('time, min'), ylabel('velocity, inch/min')

%accleration
a1= -4*r*cos(2*pi*omega*t)*(pi^2)*(omega^2);
a2= 4*r^4*(sin(2*pi*omega*t).^2).*((cos(2*pi*omega*t).^2))*(pi^2)*(omega^2);
a3=(sqrt(b^2-r^2*(sin(2*pi*omega*t).^2))).^3;
a4= 4*r^2*(cos(2*pi*omega*t).^2)*(pi^2)*(omega^2);
a5=sqrt(b^2-r^2*(sin(2*pi*omega*t).^2));
a6= +4*r^2*(sin(2*pi*omega*t).^2)*(pi^2)*(omega^2);
a7=sqrt(b^2-r^2*(sin(2*pi*omega*t).^2));
a= a1-(a2./a3)-(a4./a5)+(a6./a7);  % inches/min^2
figure
plot(t,a), xlabel ('time, min'), ylabel('acceleration, inch/min^2')

%PartB
% Determine the time for which:
% 2.1:   s < 2 inches

disp('part 2.1')
if s < 2
s1 = find(s<2);
t1 = t(s1(1))
t2 = t(s1(end))
else
   disp('time for which the position s < 2 : none')
```

Done

Citrix Access Platfor... | Zimbra: Search resul... | 100209TELMeeting | 14 Citrix ICA Clien... | Yahoo! Search | EN | 11:04 PM

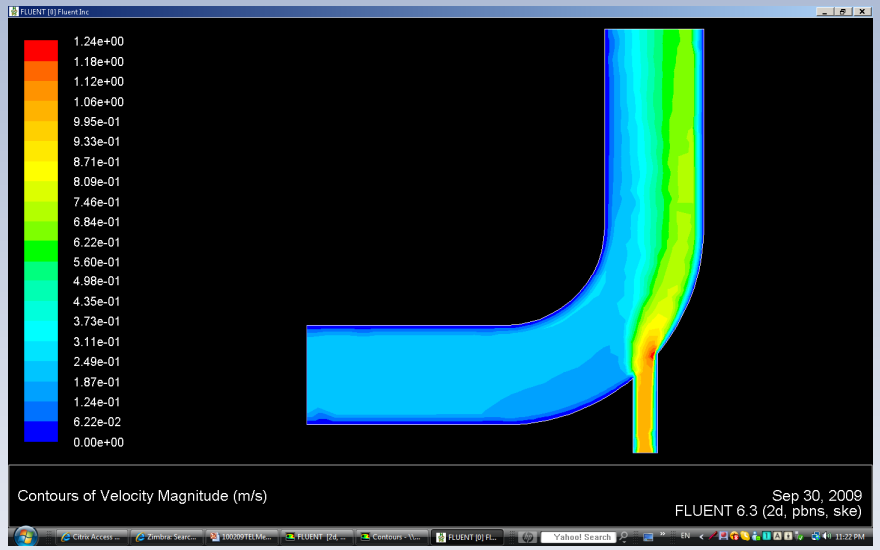
TEL - Citrix System – Fluent for CFD



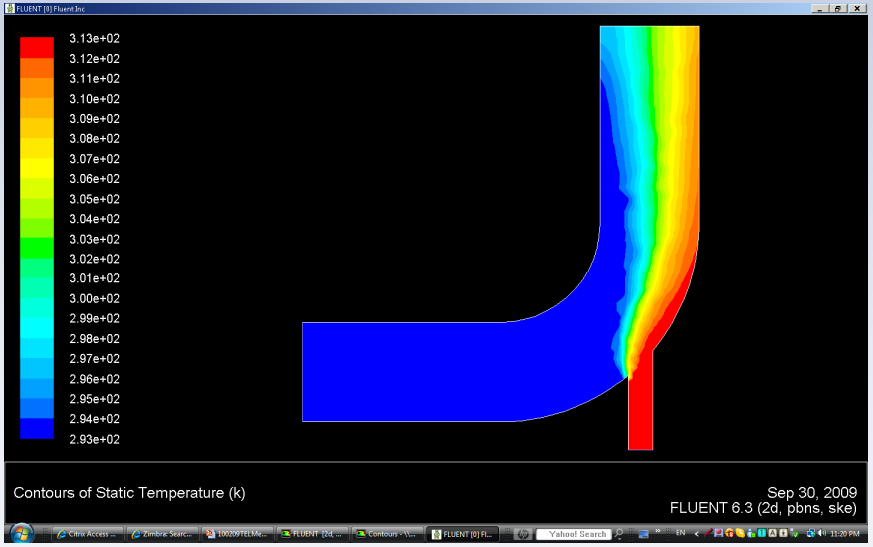
Fluid Flow and Heat Transfer in Mixing Elbow

TEL - Citrix System – CFD with Fluent

Velocity Magnitude



Temperature



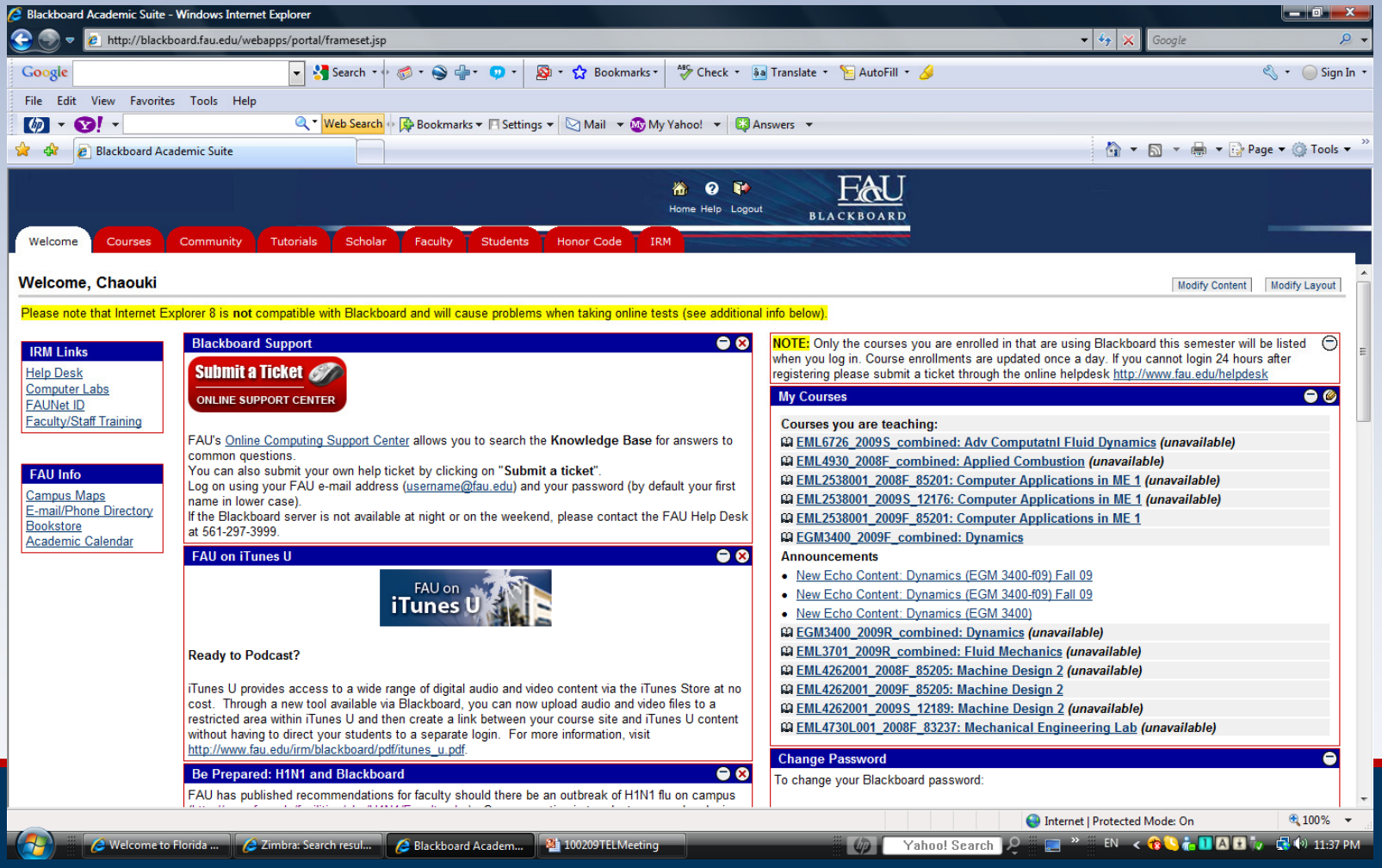
CFD Results

TEL – Back Board:

- **Blackboard** is used by students to:
  - Access course information
  - Participate in online discussions with their professor and classmates
  - Obtain homework assignments and self-assessment quizzes
  - Track their academic schedule and grades

FLORIDA ATLANTIC UNIVERSITY

TEL – Back Board (Combined Section for Feeds and Non Feeds Students)



TEL – DigiMemo: Digital Writing Pad

- Device with storage capabilities that digitally capture and store everything you write or draw on ordinary paper
- View, edit, and share your hand written notes with students

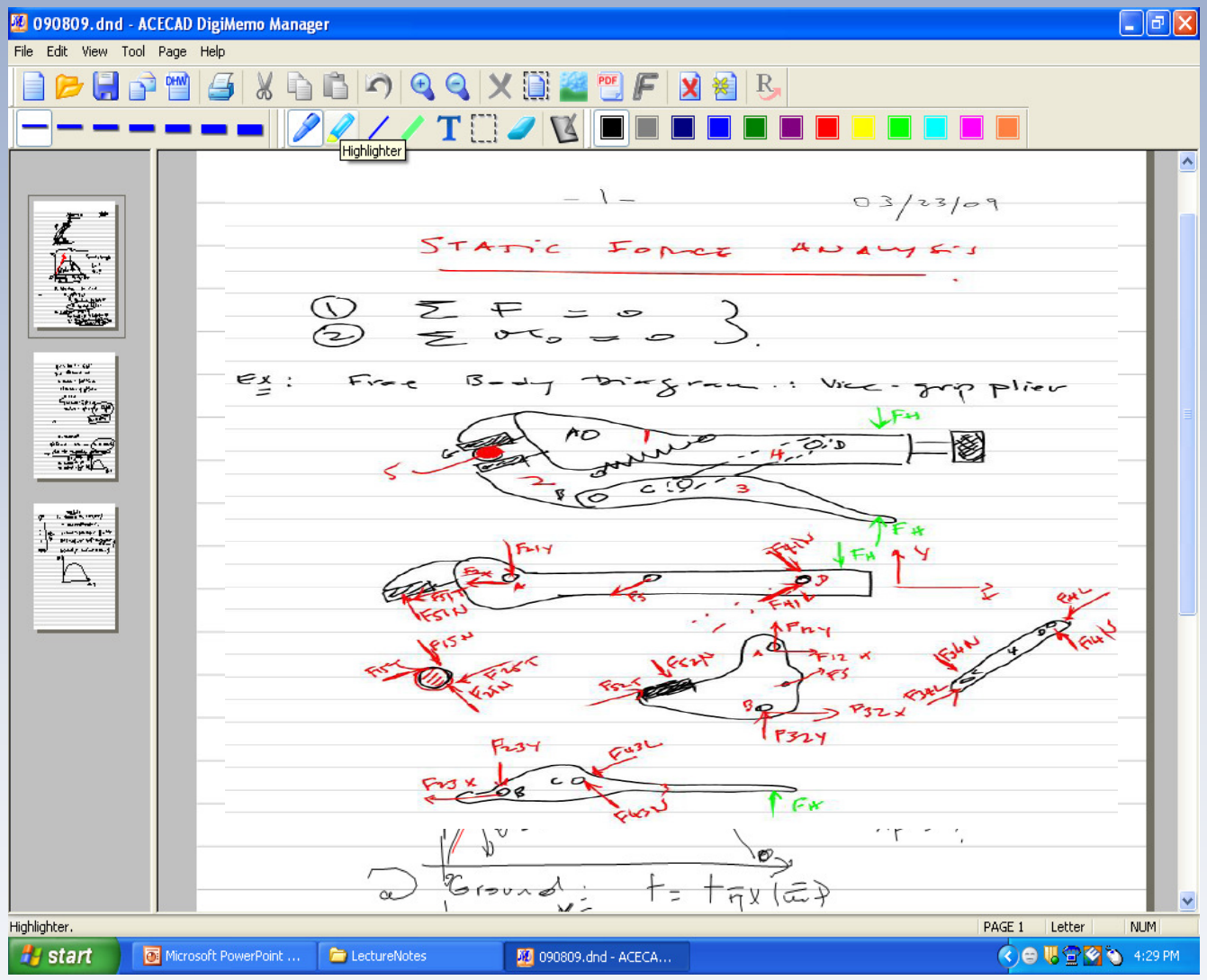
Take Notes

Connect to a PC

Organize your notes

Send via e-mail or post in blackboard

FLORIDA ATLANTIC UNIVERSITY



The lecture notes using the digital pad are posted in black board for Feeds and Non Feeds Students