NOVA COLLEGE-WIDE COURSE CONTENT SUMMARY
EGR 245 – DYNAMICS(3 CR.)

Course Description
Presents approach to kinematics and kinetics of particles (and systems of particles) in linear and curvilinear motion. Includes kinematics and kinetics of rigid bodies in plane motion. Teaches Newton's second law, work-energy, and impulse-momentum methods. Lecture 3 hours. Total 3 hours per week. 3 credits

General Course Purpose
Prepare students for further studies in branches of engineering requiring mechanics.

Course Prerequisites/Corequisites
Prerequisites: EGR 240 or departmental approval.

Course Objectives
- Critical Thinking
  - Select an appropriate coordinate system (Cartesian, normal-tangential, cylindrical) and analyze the motion of particles and rigid bodies.
  - Analyze the motion of particles and rigid bodies using different coordinate systems.
  - Analyze the motion of bodies relative to translating and/or rotating coordinate frames.
  - Use the equations of motion to compute the position, velocity, and acceleration of multiple points on rigid bodies in constrained motion.
  - Construct free-body diagrams and apply Newton's Second Law to analyze the dynamics of particles and planar rigid body motion.
  - Apply the work-energy principle, linear-impulse and momentum, angular-impulse and momentum, and conservation theorems (conservation of linear momentum, angular momentum, and energy) to particles and rigid bodies undergoing planar motion.
  - Analyze the motion of impacting particles using impulse and momentum concepts.
- Quantitative Reasoning
  - Calculate the mass moment of inertia of rigid body

Major Topics to be Included
- Particle kinematics
- Free body diagrams
- Planar rigid body kinematics
- Constrained motion of rigid bodies
- Translating/rotating coordinate systems
- Work-energy principle
- Conservation of energy
- Linear-impulse and momentum
- Conservation of linear momentum
- Angular-Impulse and Momentum
- Conservation of angular momentum
- Mass moment of inertia
- Equations of motion
- Impact (Particles only)