FLORIDA POLYTECHNIC UNIVERSITY

Syllabus: EGN3321 – Dynamics

Spring 2026

Course Information

- **Course Number and Title**: EGN3321 Dynamics, Section 1
- **Credit Hours:** 3
- **Academic Term:** Spring 2026
- **Class Time and Location:** Tuesdays & Thursdays, 08:00 – 09:15, in IST 1044

Instructor Information

- **Instructor:** Dr. Apurva Patel
- **Office Location:** BARC 1176
- **Office Hours**:
  - **[***In-person @ BARC 1176***]** Mon & Fri: 9:00 – 10:30; Tue & Thu: 10:00 – 11:30
  - **[***Virtually on Teams***]** By appointment
- **Email address**: apurvapatel@floridapoly.edu

Course Delivery and Course Description

- **Delivery Mode**: The course will be taught on campus (IST 1044), and all students are expected to attend in person.
- **Course Website**: Canvas
- **Official Catalog Course Description**: Study of the motion of particles and rigid bodies applying the vector approach. Topics include motion of a particle; motion of a rigid body; relative motion; kinetics of translation, rotation, and plane motion; work-energy methods; impulse-momentum.
  - **Course Pre and/or Co-Requisites**: EGN 3311 Statics, MAC 2313 Analytic Geometry and Calculus 2
  - **Communication/Computation Skills Requirement (6A-10.030)**: No
  - The passing letter grade for this course is a "C" or better.
- **Required Texts and Materials:**
  - ***Textbook:*** Engineering Mechanics: Dynamics, 15th Edition, 2021, Russell C. Hibbeler
  - *Other Materials*: Canvas, Computer or Tablet, Microsoft Teams, Scientific or Engineering Calculator, Florida Poly Email Address
  - ***Note***: Only calculator models approved for use on the Fundamentals of Engineering (FE) Exam will be allowed in this course.
    - Casio: All fx-115 and fx-991 models
    - Hewlett Packard: The HP 33s and HP 35s models, but no others
    - Texas Instruments: All TI-30X and TI-36X models

Course Objectives and Outcomes

- **Course Objectives**: Dynamics provides an exploration into the branch of mechanics that involves the accelerated motion of particles and rigid bodies. The subject of dynamics will be presented in two parts: 1. kinematics, which examines the geometric aspects of motion, and 2. kinetics, which explores the analysis of the forces causing motion. Dynamics extends the prior study of Statics by incorporating the motion of a body with the forces acting on it for analysis. In Dynamics, students will learn to apply Newton's laws of motion to engineering problems. Additionally, students will learn to analytically solve engineering problems where force, work, energy, impulse, and momentum impact the accelerated motion of particles and rigid bodies.
- **Course Learning Outcomes**:
  - Leverage vector analysis techniques to examine the motion of accelerated particles and rigid bodies.

- Apply Newton's laws of motion to accelerating particles and rigid bodies.
- Analyze engineering systems using principles of kinetics and kinematics.
- Integrate force, work, energy, impulse, and momentum analysis methods with vector analysis techniques to solve complex engineering problems.
- Describe the planar motion of rigid bodies using equilibrium equations and kinematic constraints.
- Implement a professional analysis format that is transferable to other topics in engineering.

- **Alignment with Program Outcomes**

Course Learning Outcome	Learning Level (Bloom's/ABET Assessment Example)	Program Learning Outcome (ABET 1-7)
Leverage vector analysis techniques to examine the motion of accelerated particles and rigid bodies.	**Knowledge:** Ability to recall previously learned material. **Application:** Ability to use learned material in new situations. **ABET Assessment:** Homework, in-class evaluations, and group activities.	An ability to identify, formulate and solve complex engineering problems by applying principles of engineering, science, and math. (ABET 1)
Apply Newton's laws of motion to accelerating particles and rigid bodies.	**Knowledge:** Ability to recall previously learned material. **Application:** Ability to use learned material in new situations. **ABET Assessment:** Homework, in-class evaluations, and group activities.	An ability to identify, formulate and solve complex engineering problems by applying principles of engineering, science, and math. (ABET 1)
Analyze engineering systems using principles of kinetics and kinematics.	**Knowledge:** Ability to recall previously learned material. **Application:** Ability to use learned material in new situations. **ABET Assessment:** Homework, in-class evaluations, and group activities.	An ability to identify, formulate and solve complex engineering problems by applying principles of engineering, science, and math. (ABET 1)
Integrate force, work, energy, impulse, and momentum analysis methods with vector analysis techniques to solve complex engineering problems.	**Synthesis:** Combination of prior knowledge for new applications. **Application:** Synthesize knowledge on assessments to solve complex problems **ABET Assessment:** in-class evaluations, Exams.	An ability to acquire and apply new knowledge as needed, using appropriate learning strategies. (ABET 7)
Describe the planar motion of rigid bodies using equilibrium equations and kinematic constraints.	**Knowledge:** Ability to recall previously learned material. **Application:** Ability to use learned material in new situations. **ABET Assessment:** Homework, in-class evaluations, and group activities.	An ability to identify, formulate and solve complex engineering problems by applying principles of engineering, science, and math. (ABET 1)
Implement a professional analysis format that is transferrable to other topics in engineering.	**Analysis:** Decomposing material into constituent parts so they can be examined and understood. **Application:** Standardize format for all work and assessments. **ABET Assessment:** Homework, in-class evaluations, and group activities.	An ability to recognize ethical and professional responsibilities in engineering situations and make informed judgments, which must consider the impact of engineering solutions in global, economic, environmental, and societal contexts. (ABET 4)

Course Policies

Attendance & Participation

Students are expected "to attend all of their scheduled University classes and to satisfy all academic objectives as defined by the instructor" (University Policy, FPU-5.0010AP). It is the student's responsibility to give the instructor notice prior to any anticipated absence and within a reasonable period after an unanticipated absence, ordinarily by the next scheduled class meeting.

Participation

Students are expected to participate in the classroom experience. The use of earbuds/headphones during class is specifically not allowed and students who engage in this behavior may be asked to leave the class for the day (noting exceptions for authorized accommodations). In addition, students who routinely do not bring materials to class that are required for participation, will not be given credit for class attendance, and if this becomes a pattern of behavior, may be asked to leave the class for the day. Persistent problems with participation may result in a code of conduct referral.

Email Policy

Emails must be sent from your Florida Poly email account to the Florida Poly email address of the instructor (apurvapatel@floridapoly.edu). **The instructor will NOT respond to messages sent through Canvas.** Please allow up to 36 hours on weekdays for a response, after which a student may send a follow-up email. Emails must be composed in a professional manner with a greeting, signature, and in an organized fashion. Start the subject line with "[EGN 3321]" for a quicker response time.

Assignment/Evaluation Methods

The instructor reserves the right to adjust grading at the end of the semester. The following list provides more details about the assignments for the course:

- **Homework Sets**: There will be a total of (tentative) 10 homework sets, worth 30% of your grade. Hand-written (on paper or with stylus) homework solutions must be submitted electronically through Canvas as a single PDF. Students' hand-written work must follow the provided format, be legible, and all figures should be drawn with a straight edge, otherwise they will not be graded. Each homework set will be due about 1 week from when the homework set was assigned.
- **Conceptual Quizzes**: There will be a total of (tentative) 6 concept evaluations, worth 10% of your grade. These evaluations are tentatively planned to be given at the start of the first lecture each week and will cover fundamental topics from the previous few lectures.
- **Exam 1, 2, & 3**: Exam 1, Exam 2, and Exam 3 will each be worth 20% of your grade for a total of 60%. The first exam will cover topics from chapter 12 through chapter 13 of the textbook. The second exam will cover chapter 14 through chapter 16. The third exam will cover topics from chapter 17 through chapter 19. On Exam 3, the instructor may add material from chapters 12 through 16 if necessary for assessment. All exams will be closed-notes and closed-book. Exam dates in the course schedule are tentative.
- **Bonus Assignments:** There may be additional opportunities throughout the semester by completing supplementary activities assigned by the instructor. These will be available at the instructor's discretion. Individual requests for additional assignments to improve a students' overall grade in the course will not be granted.

Grade Breakdown and Grading Scale

The contribution of each assessment category to your final grade is shown in Table 1. Grades for each assignment will be posted to Canvas, and students should make sure they are recorded correctly. Note that the percentages or projected grades provided through Canvas may not always be correct, and the student should consult the instructor if they are uncertain about their standing

Table 1: *Grade Breakdown*

Category	Contribution
Homework Sets	30%
Conceptual Quizzes	10%
Exam 1	20%
Exam 2	20%
Exam 3	20%
Total	**100%**

Table 2: Grading Scale

Letter Grade	Score
A	93-100
A-	90-92
B+	86-89
B	83-85
B-	80-82
C+	76-79
C	70-75
D	60-69
F	0-59

in the course. The instructor will calculate final percentages and will determine final grades regardless of Canvas calculations. This course will use the grading scale shown in Table 2. Scores will be rounded up to the nearest integer for the final grade.

Re-Grade Requests

A re-grade request can be made by a student that feels an exam was graded incorrectly. To complete the request, a student must submit a written explanation for why they believe an exam should be re-graded (1/2 to 1 page written). The request must be made no later than 1 week after receiving a grade for the exam. A re-grade request consists of the instructor re-grading the ENTIRE exam.

Late Work/Make-up work

Homework assignments may be submitted up to two days late, with a 10% grade penalty per day. No make-up options will be provided for in-class quizzes, expect for documented health or university related circumstances. Make-up opportunities will only be granted for exams in exceptional circumstances and at the discretion of the professor. Students are expected to reach out to the instructor well in advance of an exam or provide a valid justification if doing so ahead of time is not possible.

University Policies

Reasonable Accommodations

The University is committed to ensuring equal access to all educational opportunities. The Office of Disability Services (ODS), facilitates reasonable accommodations for students with disabilities and documented eligibility. It is the student's responsibility to self-identify as a student with disabilities and register with ODS to request accommodations. If you have already registered with ODS, please ensure that you have requested an accommodation letter for this course through the ODS student portal, and communicate with your instructor about your approved accommodations as soon as possible. Arrangements for testing accommodations must be made in advance. Accommodations are not retroactive. If you are not registered with ODS but believe you have a temporary health condition or permanent disability requiring an accommodation, please contact ODS as soon as possible: DisabilityServices@floridapoly.edu; (863) 874-8770; www.floridapoly.edy/disability.

Accommodations for Religious Observances, Practices and Beliefs

The University will reasonably accommodate the religious observances, practices, and beliefs of individuals in regard to admissions, class attendance, and the scheduling of examinations and work assignments. (See University Policy.)

Title IX

Florida Polytechnic University is committed to ensuring a safe, productive learning environment on our campus that prohibits sex discrimination and sexual misconduct, including sexual harassment, sexual assault, dating violence, domestic violence and stalking. Resources are available if you or someone you know needs assistance. Any faculty or staff member you speak to is required to report the incident to the Title IX Coordinator. Please know, however, that your information will be kept private to the greatest extent possible. You will not be required to share your experience. If you want to speak to someone who is permitted to keep your disclosure confidential, please seek assistance from the Florida Polytechnic University Ombuds Office, BayCare's Student Assistance Program, 1-800-878-5470 and locally within the community at Peace River Center, 863-413-2707 (24-hour hotline) or 863-413-2708 to schedule an appointment. The Title IX Coordinator is available for any questions to discuss resources and options available.

Academic Integrity

Violations of academic integrity regulation include actions such as cheating, plagiarism, use of unauthorized resources (including but not limited to use of Artificial Intelligence tools), illegal use of intellectual property, and inappropriately aiding other students. Such actions undermine the central mission of the university and negatively impact the value of your Florida Poly degree. Suspected violations will be fully investigated, possibly resulting in sanctions up to and including expulsion from the university.

Recording Lectures

Students may, without prior notice, record video or audio of a class lecture for a class in which the student is enrolled for their own personal educational use. Recordings may not be used as a substitute for class participation or class attendance. Recordings may not be published or shared in any way, either intentionally or accidentally, without the written consent of the faculty member. Failure to adhere to these requirements is a violation of state law (subject to civil penalty) and the student code of conduct (subject to disciplinary action). *Recording class activities including, but not limited to, lab sessions, student presentations (whether individually or part of a group), class discussion (except when incidental to and incorporated within a class lecture), and invited guest speakers is* ***prohibited***.

Academic Support Resources

- **Library**: Students can access the Florida Polytechnic University Library through the University website and Canvas, on and off campus. Students may direct questions to library@floridapoly.edu.
- **Tutoring and Learning Center**: The Tutoring and Learning Center (The TLC) provides tutoring to all Florida Poly students who may need additional academic support. The TLC is staffed by students who have excelled in the courses they tutor. They offer support by reviewing concepts and materials from class, clarifying points of confusion and providing assistance with learning strategies. While the focus of TLC is to provide support to students in freshman-level courses, upper-level courses are also tutored at the Center. The TLC is located in the IST Commons (second floor).
    - **Knack Tutoring**: Students looking for additional assistance outside of the classroom are advised to consider working with a peer tutor through Knack. Florida Polytechnic University has partnered with Knack to provide students with access to verified peer tutors who have previously aced this course. To view available tutors, visit floridapoly.joinknack.com and sign in with your student account.
- **Academic Success Coaches**: All students at Florida Poly are assigned an Academic Success Coach. Your Academic Success Coach can assist you with academic success strategies. Please visit the Student Success Center on the second floor of the IST building to meet with an Academic Success Coach.
- **Writing Center**: Located on the second floor of the IST (2059/2061), the Writing Center helps students to develop their writing and presentation skills. Consultations are available in person and virtually. For more detail, visit floridapoly.edu/writing center.

Tentative Course Schedule

The planned course schedule shown in Table 3 includes the sequence of lectures and the expected deadlines for assignments. The schedule may be changed or updated at the instructor's discretion. Any such changes will be communicated in class.

Table 3: *EGN 3321 Course Schedule for Spring 2026*

Week	Day	Date	Topic	Chapter	Due
1	T	13-Jan	Introduction	N/A	Introductory Worksheet; Syllabus Quiz
	R	15-Jan	Kinematics of a Particle	12.1 - 12.2	
2	T	20-Jan	Rectilinear Kinematics	12.1 - 12.2	Homework Set 1
	R	22-Jan	Curvilinear Motion - Rectangular	12.4 - 12.5	
3	T	27-Jan	Projectile Motion	12.6	Conceptual Quiz 1; Homework Set 2
	R	29-Jan	Curvilinear Motion – N&T	12.7	
4	T	3-Feb	Relative Motion of a Particle	12.9 - 12.10	Homework Set 3
	R	5-Feb	Newton's 2nd - Rectangular	13.10 - 13.4	
5	T	10-Feb	Career Day - No Classes		Conceptual Quiz 2; Homework Set 4
	R	12-Feb	Newton's 2nd - N&T, Polar	13.5, 13.6	
6	T	17-Feb	Buffer Day / Exam Review		Exam 1
	R	19-Feb	Exam 1 (Tentative)		
7	T	24-Feb	Work, Energy, Power, & Efficiency	14.1 - 14.5	Feedback Form
	R	26-Feb	Conservation of Energy	14.6	
8	T	3-Mar	Linear Impulse & Momentum	15.1 - 15.3	Concept Evaluation 3; Homework Set 5
	R	5-Mar	Impact	15.4	
9	T	10-Mar	Angular Momentum	5.5	Homework Set 6
	R	12-Mar	Kinematics of a Rigid Body	16.1 - 16.3	
10	T	17-Mar	Spring Break - No Classes		Concept Evaluation 4
	R	19-Mar			
11	T	24-Mar	Relative Motion of a Rigid Body	16.5	Homework Set 7
	R	26-Mar	Instantaneous Center	16.6	
12	T	31-Mar	Buffer Day / Exam Review		Exam 2
	R	2-Apr	Exam 2 (Tentative)		
13	T	7-Apr	Rigid Body Kinetics	17.1 - 17.3	Concept Evaluation 5
	R	9-Apr	Rotation About a Fixed Axis	17.4	
14	T	14-Apr	General Plane Motion	17.5	Homework Set 8
	R	16-Apr	Rigid Body Work & Energy	18.1 - 18.4	
15	T	21-Apr	Conservation of Energy	18.5	Concept Evaluation 6; Homework Set 9
	R	23-Apr	Linear & Angular Momentum	19.1 - 19.3	
16	T	28-Apr	Conservation of Momentum	19.3	Homework Set 10
	R	30-Apr	Reading Day – No Lecture		
17	M-F	Finals	Exam 3 (TBD)		