

**SCHOOL OF KINESIOLOGY
COLLEGE OF HEALTH
BALL STATE UNIVERSITY**

INSTRUCTOR INFORMATION**Instructor:** Henry Wang**Office:** Biomechanics Laboratory, HP 311B**Phone:** 765-285-5126**Office hours:** M & W: 12pm – 1pm; or by appointment**Email:** hwang2@bsu.edu**COURSE DESCRIPTION**

The EXSC 655 introduces graduate students fundamental knowledge of statics and dynamics in mechanics. This course will lay a foundation to apply mechanical principles to human movement, particularly those pertaining to exercise, sport, and physical activity.

COURSE OBJECTIVES

The purpose of EXSC 655 is to introduce graduate students the foundation of engineering mechanics that will help graduate students perform biomechanical analysis for human movements. This course also has an emphasis on biomechanical analysis techniques and procedures. The course will be delivered in both lecture and in-class problem solving formats. The following goals will be accomplished: 1. To be familiar with Vector operation. 2. To understand Basic Statics. 3. To understand Basic Dynamics. 4. To understand Static Equilibrium. 5. To understand Inverse Dynamic Analysis.

LECTURE TIMES & LOCATION:

Monday 4:00pm – 6:30pm HP254

RECOMMENDED TEXT AND MATERIALS:

Winter, D., Biomechanics and Motor Control. 2009. Fourth edition. John Willy and Son.

GRADING:

Midterm Exam	20%
Final exam	30%
Class performance (attendance, solving problems in class)	50%

GRADING SCALE:

A = 93% - 100%; A- = 90% - 92%; B+ = 87% - 89%; B = 83% - 86%; B- = 80% - 82%; C+ = 77% - 79%;
C = 73% - 76%; C- = 70% - 72%; D+ = 67% - 69%; D = 63% - 66%; D- = 60% - 62%; F = <60%

TENTATIVE TOPICS

Sections	Topic
1	Notations, Scalars and Vectors, Vector operations
2	Newton's laws
3	Statics and Static Equilibrium
4	Coordinate System Transformation
5	Force Structure
6	Virtual Markers

7	Dynamics and Inverse Dynamics
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TENTATIVE SCHEDULE**

Week	Topic
Week 1	Basic Concepts and Notation; Scalars and Vectors; Vector operations; Newton's Laws
Week 2	Force systems – Force and Moment (2D)
Week 3	Force systems – Force and Moment (3D)
Week 4	Static Equilibrium – Mechanical system isolation; Equilibrium condition (2D)
Week 5	Static Equilibrium – Equilibrium condition (3D)
Week 6	Midterm Exam
Week 7	Dynamics of particles - Kinematics
Week 8	Dynamics of particles – Kinetics
Week 9	Dynamics of rigid bodies – Kinematics
Week 10	Dynamics of rigid bodies - Kinetics
Week 11	Moments of Inertia
Week 12	Inverse Dynamics (2D)
Week 13	Inverse Dynamics (3D)

IMPORTANT DATES:

Monday, January 5, 2026: First Day of Class (welcome!)
Monday, January 19, 2026: Martin Luther King Jr Day No Classes
Sunday, March 1 – Sunday March 8, 2026: Spring Break
Monday, April 27, 2026: Last meeting day for regular classes
Tuesday, April 28, 2026- Friday, May 1, 2026: Final Examination Period
Saturday, May 2, 2026 May Commencement

ABSENCES:

Please make every possible effort to communicate to me any expected absences, especially absences on days of exams or when assignments are due. For lab absences, please communicate with your lab instructor. Make-up exams, if approved in advance, will be scheduled *before* the regular exam time. Unexcused absences will be handled on an individual basis; you will be required to document any such absences.

CLASSROOM ENVIRONMENT:

No foods and drinks in the class room during the lecture time. No cell phone calls and text messaging. No surfing internet in class.

Wearing face masks is optional. Face masks should be worn so that they cover the individual's nose and mouth, and the type of mask should be consistent with CDC guidance. This means the face mask should help prevent respiratory droplets from traveling into the air and onto other people when the person wearing the face mask coughs, sneezes, talks, or raises

their voice.

SPECIAL STUDENT NEEDS:

If you need course adaptations or accommodations because of a disability, please contact me as soon as possible. Ball State's Disability Services office coordinates services for students with disabilities; documentation of a disability needs to be on file in that office before any accommodations can be provided. Disability Services can be contacted at 765-285-5293 or dsd@bsu.edu.

ACADEMIC INTEGRITY AND DISHONESTY:

Students of the university must conduct themselves in accordance with the highest standards of academic honesty and integrity. Academic dishonesty by a student will not be tolerated in activity or academic areas and will be treated in accordance with the policy in the faculty handbook. Please refer to the specific sections in Undergraduate Rights and Responsibilities for information regarding academic honesty. These policies (including cheating on exams and plagiarism) will be strictly enforced. I will not tolerate cheating or plagiarism. Incidents of academic dishonesty will be prosecuted to the full extent within the university judicial process! Failure to follow these guidelines will result in an "F" for the course.

EMAIL ETIQUETTE:

Emails need to include complete words and phrases with proper capitalization and punctuation. Emails will only be responded to if they can be read, name, course and section number are included.

THE LEARNING CENTER:

The Learning Center offers free tutoring for most courses in the core curriculum, for a variety of math, economics, accounting, and physics courses, for any writing task, and for general study strategies such as time management, test taking, speed reading, and effective textbook reading and note taking. We also tutor for many courses outside of the core curriculum. Call 285-1006 or visit NQ 350 to make an appointment to meet with a tutor. We can help! Tutoring is available one-on-one or in small groups.

INTERNATIONAL STUDENTS:

The Learning Center has tutors trained to address some of the challenges specific to International Students and if you are having trouble understanding information presented in class, you are encouraged to contact the Learning Center. Bilingual tutors may also be available upon request.

WRITING CENTER INFORMATION:

Want extra feedback on your papers? The Writing Center is a community of Ball State students and faculty who value writing. Come and collaborate with one of our trained peer tutors on any project for any major. The Writing Center is a comfortable, supportive environment for writers from all communities and backgrounds. It is located in Robert Bell 291. We have both online and face-to-face appointments. To make an appointment go to www.ballstate.mywconline.com.

COURSE WITHDRAWAL: - There is only one withdrawal period. It extends from the 6th through the 45th day of classes during fall or spring semester. **See important dates.**

For fall and spring semesters, a student has the entire first week of courses to drop a course with no penalty. They do this through "Add/Drop/Registration" from the website www.bsu.edu/student services. After the first week, a student can withdraw from a course with a grade of "W" up until the decided upon withdrawal date. They accomplish this by completing a Withdrawal form and turning it in to the Registrar located in Lucina Hall. After this withdrawal date a student may only withdraw and receive a grade of "W" (instead of an "F") if they are confirmed to have proper extenuating circumstances.

UNIVERSITY STATEMENT

We are committed to ensuring that all members of the community are welcome, through valuing the various experiences and worldviews represented at Ball State and among those we serve. We promote a culture of respect and civil discourse. If you need course adaptations or accommodations because of a disability, please contact the instructor of record as soon as possible. Ball State's [Disability Services Office](#) coordinates services for students with disabilities; documentation of a disability needs to be on file in that office before any accommodations can be provided. Disability Services can be contacted at 765-285-5293 or dsd@bsu.edu.

FREEDOM OF EXPRESSION

In this course, we are committed to fostering a learning environment that values intellectual diversity, encourages free expression, and promotes open inquiry. As members of the Ball State Community, we treat each person in the Ball State community with civility, courtesy, compassion, and dignity and respect and learn from differences in people, ideas, and opinions. Please review Ball State University's [Statement on Freedom of Expression](#), the resources on Ball State's [Freedom of Expression webpage](#), and [Ball State's Beneficence Pledge](#).