

## **Institutional Effectiveness Report 2021-2022**

**Program:** Exercise Science BS

**College and Department:** College of Education - Department of Exercise Science, Physical Education and Wellness

**Contact:** Christy Killman, Chairperson

**Mission:** The mission of the department of Exercise Science is to promote enhanced quality of life (wellness) and strengthen educational pursuits by creating, advancing, communicating and applying knowledge and skills, through innovative preparation of scholars, researchers, educators and professionals to meet the needs of a diverse society. (Directly linked to Tech Tomorrow Strategic Goal One – Education for Life; priority actions A, C, D & E. Also linked to Goal Two – Innovation in All We Do; priority actions B and C.)

*Mission Brief:* Be prepared for service to enhance quality of life for a diverse society.

*Vision:* Prepare future professionals to be effective and engaged through clinical rich and evidenced based programs.

**Program Goals:** This program will prepare students to apply knowledge and skills in their chosen area of study to contribute to enhanced quality of life for themselves and a diverse society.

### **Student Learning Outcomes:**

1. Physical fitness – Exercise Science majors will demonstrate health enhancing levels of fitness by satisfying standardized criteria for muscular strength/muscular endurance, flexibility, cardiorespiratory endurance, leg power, grip strength and body mass while participating in the annual physical fitness assessment.
2. Knowledge and understanding of basic research – Exercise Science majors will demonstrate understanding of the basic methods of research by meeting outlined criteria from a teacher created rubric on the final project in EXPW 4730 – Assessment in Exercise Science class.
3. Knowledge of the field – Exercise Science majors will demonstrate knowledge in the field by answering correctly 80% or more of identified concept questions on the final exam in EXPW 3410 - Motor Development.

A departmentally developed curriculum map can be found in Appendix 1 that shows the connections between courses and student learning outcomes.

### **Assessment Methods:**

1. *Physical fitness test once per academic year.* - The tool used in administration of this test is a nationally normed, proprietary assessment with demonstrated validity and reliability. Each student in the Exercise Science department must take the fitness test once per academic year – either on the fall rotation or spring rotation. Graduate assistants are test administrators, and are professionally trained bi-annually on proper administration protocols for each of the test components. Each undergraduate major sign up for one of the testing sessions through Eagle Online. Each group meets four different days in preparation for and to participate in the fitness test. Students complete the PAR-Q (physical activity readiness questionnaire), fill out their



personal scoring sheet and walk-through demonstration of each test during the first meeting. The second meeting is for practice/questions and to collect body mass data from each student. Meeting 3 includes administration of all tests except the cardiorespiratory endurance assessment. Students run (cardiorespiratory endurance) during the fourth meeting. Each undergraduate student must pass 5 of the 6 different tests according to the health enhancing level of fitness criteria. If any student does not satisfy this requirement, the graduate assistant works with the student, providing information and support related to improvement in that area of fitness. Students have multiple opportunities to improve and satisfy the requirements. (score sheet with national norms attached)

2. *Study design, data collection, analysis and presentation project in EXPW 4730* – Assessment in Exercise Science class. For the capstone project in the assessment class, students must apply understanding of basic research concepts working in a small group to design a study, collect data, analyze data and present their project to their peers. All students are ‘subjects’ for all studies in this class, causing this project to be directly linked to activity of some sort, which causes students to apply knowledge from other courses in their study design and data collection. Class time is provided for data collections by each of the groups. The instructor created rubric provides guidance for students in preparing and presenting their research. Even though this is a group project, each student is scored individually according to their contribution to and presentation of the research. (rubric attached)
3. *Key identified concepts (knowledge assessment) in EXPW 3410* – Motor Development. Motor development includes foundational concepts that most classes in Exercise Science depend/build heavily on. This course has key concepts, ideas or theories that are monumental to understanding development and learning related motor skills and mature, efficient movement. On the final cumulative exam in EXPW 3410, the key components (directly related to the course objectives) are assessed along with other relevant information from each course. 12 to 15 questions on the final exam are dedicated to these key components. Students are expected to answer identified questions with 80% or higher accuracy to indicate mastery. (Key questions attached)

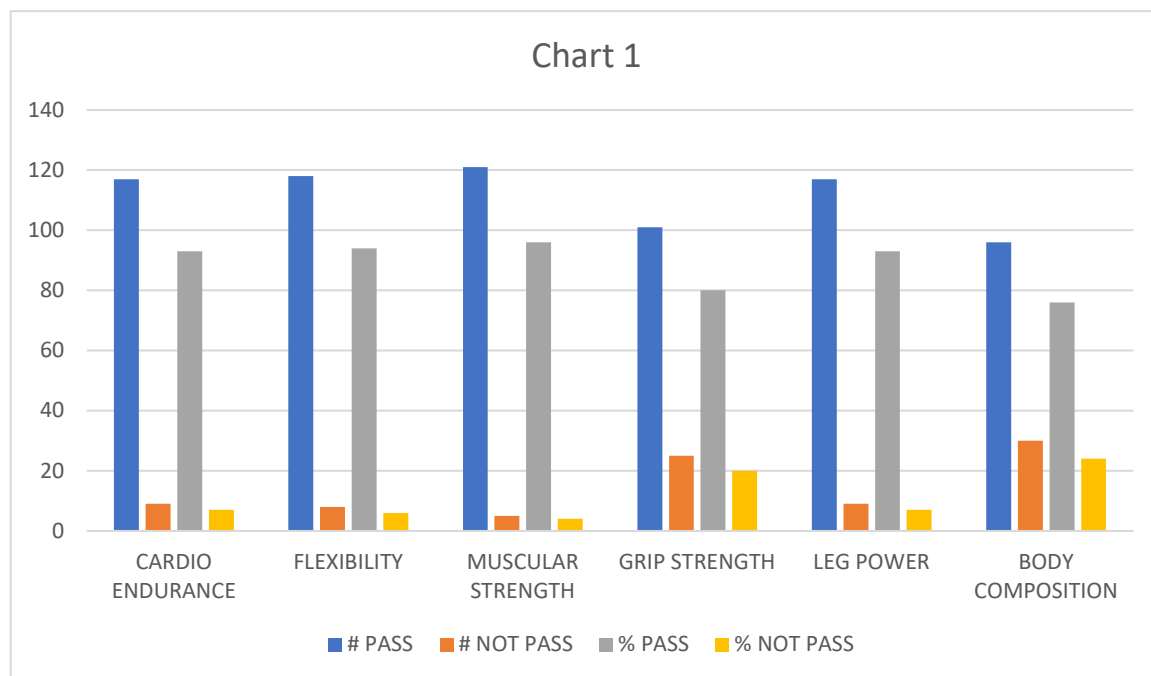


## Results:

### Student Learning Outcome 1 – Physical Fitness

The results for a sample group of students (N=126) were examined. When compared to valid and reliable national norms for this age group, the percentage of students in the sample group who “passed” all portions of the fitness assessment with a health-enhancing level of fitness was overall very high. The chart and table below outline the level of fitness for the sample group.

When compared to data from 2021-2022, outcomes are similar with highest numbers (and percentages) of students not meeting the health-enhancing norm continue to be in grip strength and body composition. There was a noticeable increase in passing percentage in leg power when compared to data from the previous year. Scores of the sample group indicate high pass rate in the areas of cardio endurance, flexibility and muscular strength.



**TABLE 1**

# STUDENTS 126	# PASS	# NOT PASS	% PASS	% NOT PASS
CARDIO ENDURANCE	117	9	93	7
FLEXIBILITY	118	8	94	6
MUSCULAR STRENGTH	121	5	96	4
GRIP STRENGTH	101	25	80	20
LEG POWER	117	9	93	7
BODY COMPOSITION	96	30	76	24



## Student Learning Outcome 2 – Knowledge and understanding of basic research

The results of the research project for students in EXPW 4730-001 and EXPW 4730-002 (Assessment in Exercise Science) in fall 21 and spring 22 semesters were examined. On the rubric for the final project (attached) students are scored in six area with each being broken down with point values attached to each. Students are scored based on individual contribution to the project and the presentation. Results are presented below. From the data, one sees that students are strongest in finding articles related to their research area, can construct pleasingly aesthetic visuals and pay attention to detail in writing in APA format. While rubric scores are high, in general, students continue to need to improve in defining research methods and presenting results. When compared to the previous academic year, the overall results are very similar, indicating students are learning about research methods throughout the course.

Chart 1

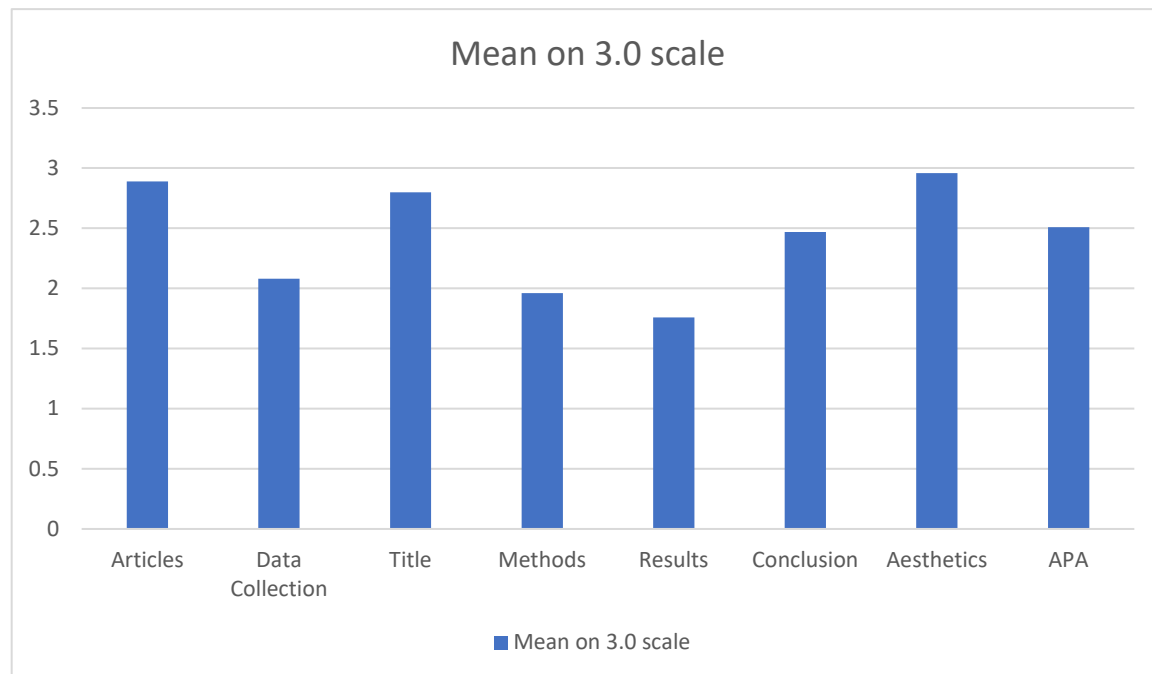


Table 1

Fall '21 #37	Mean on 3.0 scale
Articles	2.89
Data Collection	2.08
Title	2.8
Methods	1.96
Results	1.76
Conclusion	2.47
Aesthetics	2.96
APA	2.51



Chart 2

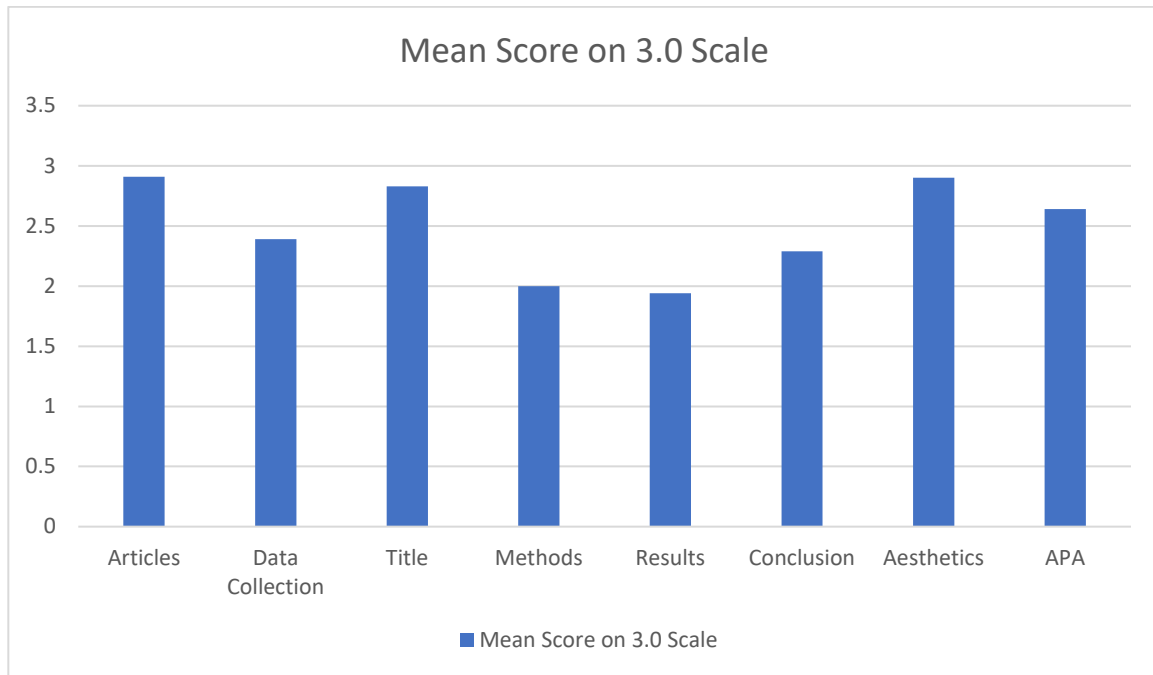
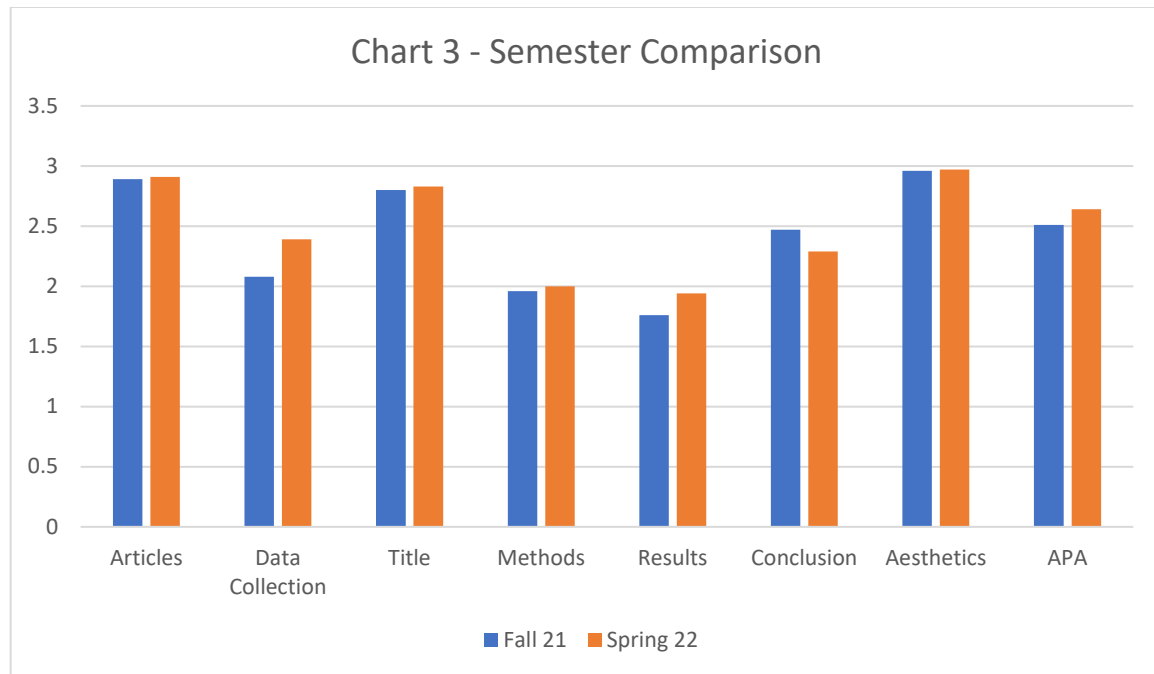


Table 2

Spring '22 # 40	Mean Score on 3.0 Scale
Articles	2.91
Data Collection	2.39
Title	2.83
Methods	2
Results	1.94
Conclusion	2.29
Aesthetics	2.9
APA	2.64





**Table 3**

2021-22 year	Fall 21	Spring 22
Articles	2.89	2.91
Data Collection	2.08	2.39
Title	2.8	2.83
Methods	1.96	2
Results	1.76	1.94
Conclusion	2.47	2.29
Aesthetics	2.96	2.97
APA	2.51	2.64



### Student Learning Outcome 3 – Knowledge of the field

The final exam for students in EXPW 3410 (Motor Development) presents 14 questions that are identified as relevant in measuring understanding of and meeting the expectations of six learning objectives listed on the course syllabus. (attached). Test papers for 37 students in the fall 2021 semester and 44 students in the spring 2022 semester were examined and answers tallied for each of the 14 questions. Results are presented below.

Questions were linked to the corresponding objective. The number of students and percentage of students who got correct answers per objective is presented below. To be labeled as “passing”, the student had to get all of the questions for that objective correct on the exam.

In comparing Chart 1 and Chart 2, one finds that the 80% threshold for passing is met on all objectives except #4 in the fall. In the spring semester, students seemed to struggle with understanding, potentially due to unforeseen shift in instructors, and fell short of the 80% threshold on 50% of the objectives (3,4 & 5). Objective 4 gave students the most trouble related to understanding/mastery of the content, with pass rate of 68%, thus, this will be addressed for the 2022-23 academic year.

Percentages are rounded up to the nearest whole number.

Chart 1

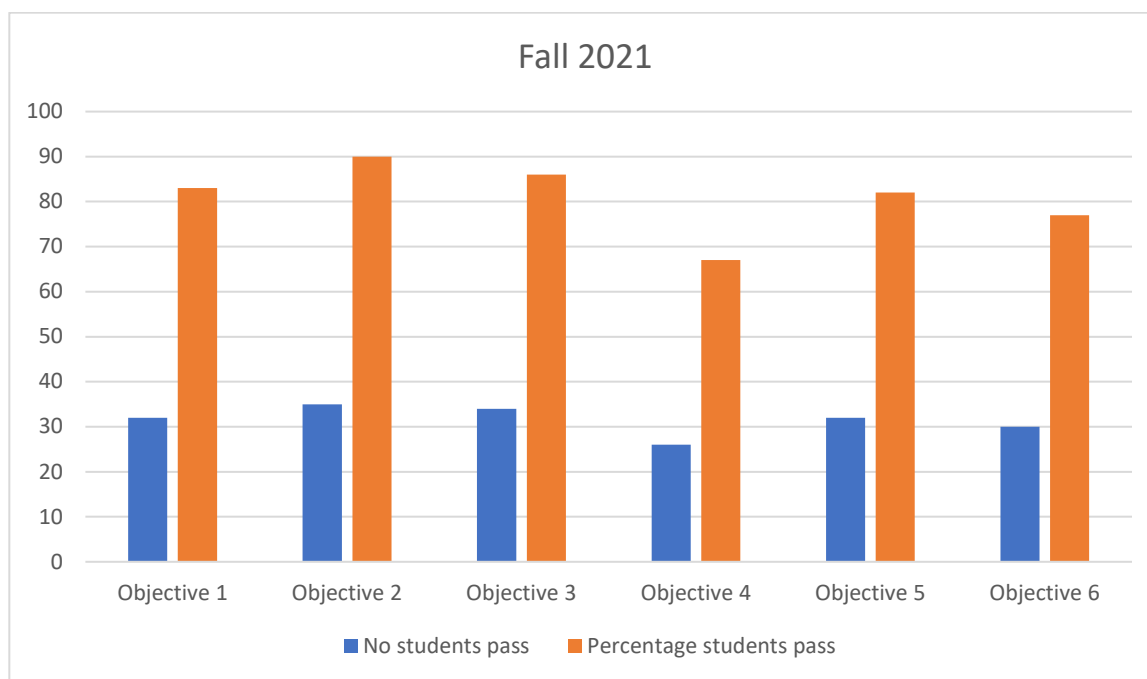


Table 1

Fall 2021 - 39 students	No. students pass	Percentage students pass
Objective 1	32	83
Objective 2	35	90
Objective 3	34	86
Objective 4	26	67
Objective 5	32	82
Objective 6	30	77



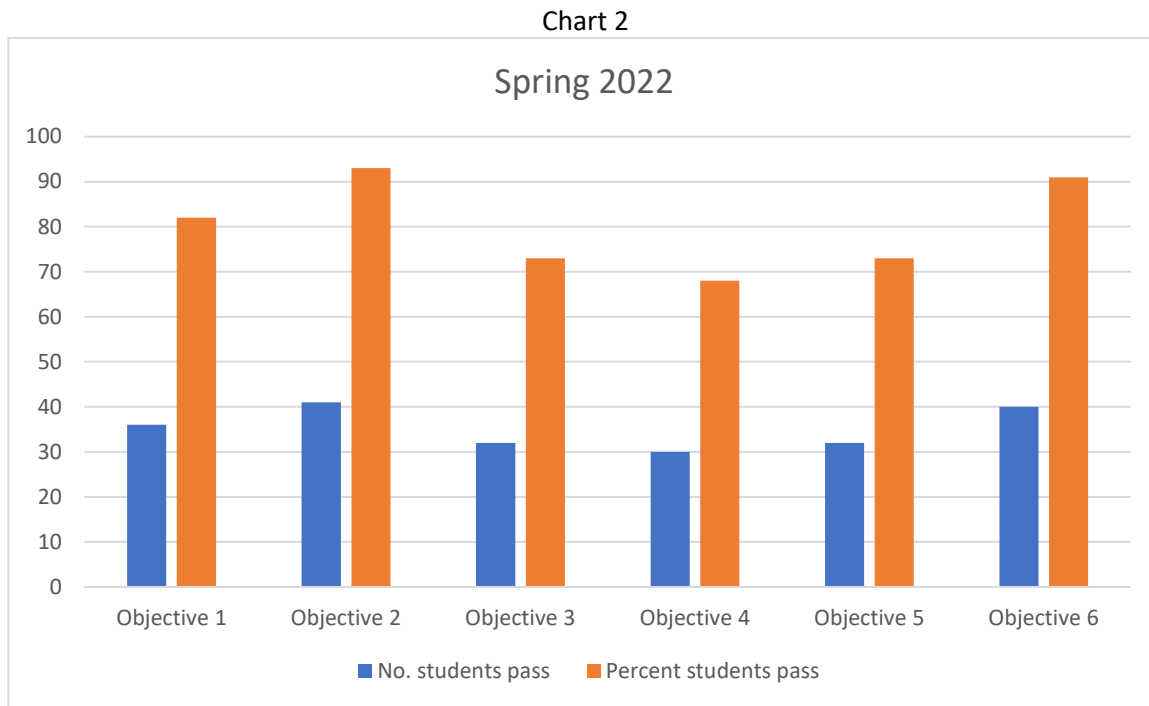


Table 2

Spring 22 - 44 students	No. students pass	Percent students pass
Objective 1	36	82
Objective 2	41	93
Objective 3	32	73
Objective 4	30	68
Objective 5	32	73
Objective 6	40	91



Chart 3

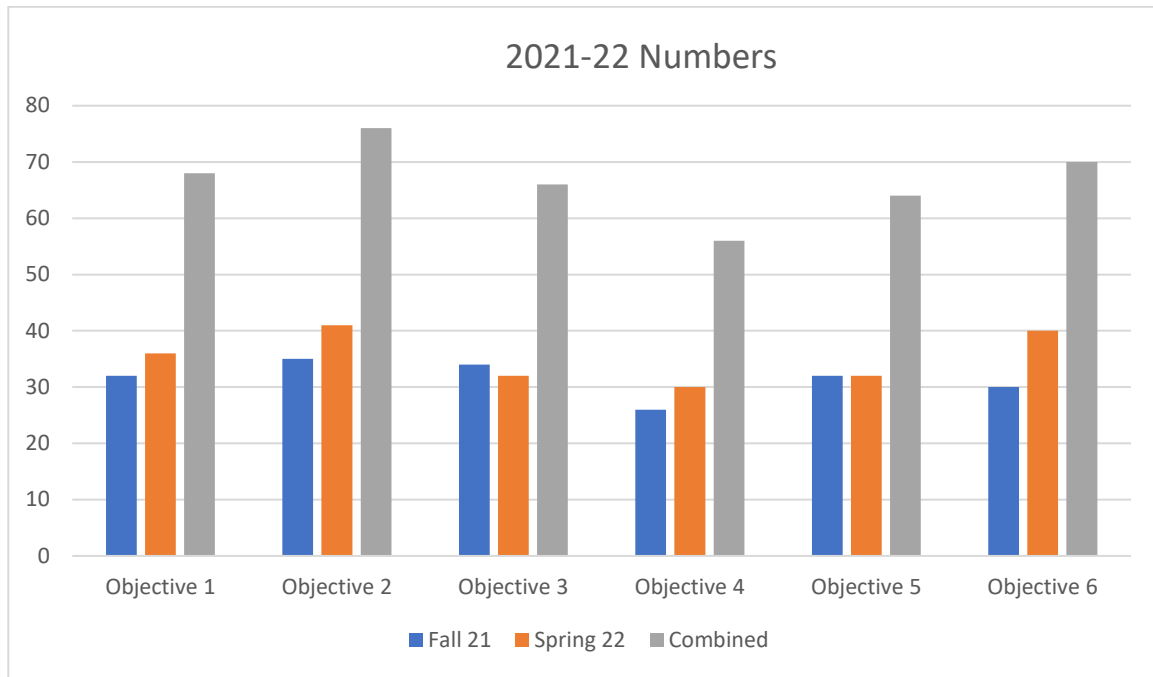


Table 3

# = 83	Fall 21	Spring 22	Combined
Objective 1	32	36	68
Objective 2	35	41	76
Objective 3	34	32	66
Objective 4	26	30	56
Objective 5	32	32	64
Objective 6	30	40	70



Chart 4

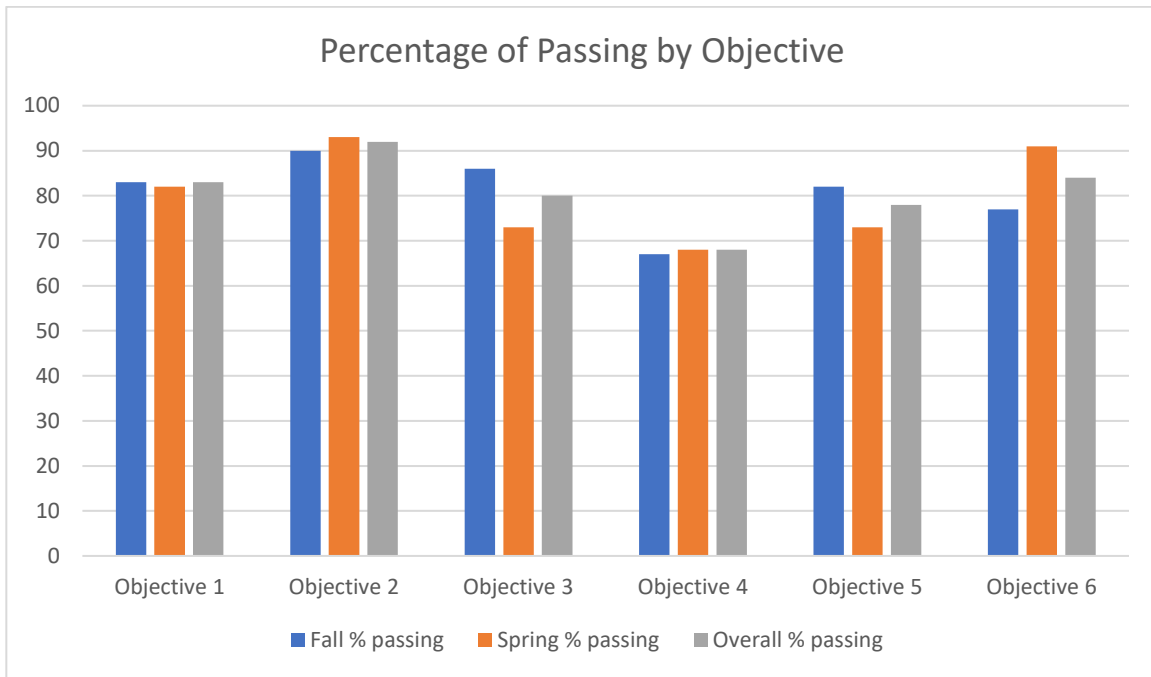


Table 4

	Fall % passing	Spring % passing	Overall % passing
Objective 1	83	82	83
Objective 2	90	93	92
Objective 3	86	73	80
Objective 4	67	68	68
Objective 5	82	73	78
Objective 6	77	91	84



## Modifications for Improvement

### Student Learning Outcome 1 – Physical Fitness

Overall, Exercise Science majors display an above average level of health-enhancing fitness. Professional training on proper test battery administration protocols continues bi-annually. Graduate assistants are assigned to the various tests, depending on their level of training, comfort level with proper protocols and ability to accurately record data. Students complete the PAR-Q and Fit Index to help identify potential issues. The order in which each test component is administered has been modified to produce the most accurate results for each student. Administering bench press and collecting height/weight data on day 1 of the test, Bioelectrical impedance, vertical jump and grip strength on day 2 of the test and 1.5 mile run and sit-n-reach test on day 3 will help with flow and completion time, as well as set students up for success in each of the individual tests.

### Student Learning Outcome 2 – Research

Results from 2021-22 academic year compared to data from the previous year indicate that students are performing at about the same level of understanding and mastery from year to year. Instructor will spend more time discussing the testing and data collection protocols moving forward, and be accessible for student groups to consult before and during data collection. The research method must be approved by instructor before data collection begins.

### Student Learning Outcome 3 – Knowledge of the field

From the analysis of this data modifications for the future include (1) identify additional ways to help individual students and classes as a whole understand concepts that are more difficult so that more students are more successful in mastery of the 6 identified learning objectives, (2) include a capstone type project (recommended last year, but did not happen due to instructor changes) to reinforce theories, principles and concepts that should be mastered in this course, (3) include EXPW 3170 – Motor Learning in the measurement of “knowledge of the field” starting in the 2022-23 academic year. This was recommended for last year, but did not happen because of unforeseen instructor shifts.

## Appendices

1. Curriculum Map
2. Fitness Test Score Sheet
3. Final Project Rubric (Assessment)
4. Motor Development Exam Questions
5. Motor Development Syllabus



## Appendix 1: Curriculum Map

### Exercise Science BS

Course	Title	Goals/Learning Outcomes		
		Physical fitness	Research skills	Knowledge of the field
EXPW 1022			X	
EXPW 3032			X	X
EXPW 3410			X	X
EXPW 3550				
EXPW 4032		X	X	X
EXPW 4420		X	X	X
EXPW 4440		X	X	X
EXPW 4730			X	X
EXPW 4731			X	
EXPW 4900			X	
EXPW 4991			X	
PHED 1002		X		



## Appendix 2: Fitness Test Score Sheet

Department of Exercise Science, Physical Education & Wellness  
Fitness Assessment Record

Name & T# \_\_\_\_\_ Concentration

\_\_\_\_\_

Test	Criteria	Score	Initialed By	Pass or Fail
YMCA Bench Press Test	M-80lbs/20 reps F-35lbs/16 reps			
Sit and Reach	M- $\geq$ 13 in F- $\geq$ 16 in			
Leg Power	M- $\geq$ 16 in F- $\geq$ 12 in			
Grip Strength	M – 84kg F – 54kg			
Body Composition (BMI and BF%)	M&F < 25 M: 8-22% F: 16-28%			
1.5 Mile Run	M – 14:00 or less F – 18:30 or less			

Date and Time of Test Administration

\_\_\_\_\_



## **Appendix 3: Final Project Rubric**

### **EXPW 4730 - Presentation Scoring Rubric**

#### Articles – 6 points

- \_\_\_\_\_ Submit professional articles: (2) Peer Reviewed; (1) Reliability of Instrument(s)
- \_\_\_\_\_ Submit articles on topic

#### Data Collection – 6 points

- \_\_\_\_\_ Provide sufficient practice/warm-up for testing
- \_\_\_\_\_ Administer tests correctly
- \_\_\_\_\_ Minimize measurement error

#### Title/Introduction – 8 points

- \_\_\_\_\_ Correct research question written as title
- \_\_\_\_\_ Establish need for study
- \_\_\_\_\_ Describe what should be expected based on previous articles
- \_\_\_\_\_ State accurate purpose of the study

#### Methods – 12 points

- \_\_\_\_\_ Describe participants
- \_\_\_\_\_ Report instruments
- \_\_\_\_\_ Report reliability/validity evidence of instruments
- \_\_\_\_\_ Describe Procedures accurately (reproducible)
- \_\_\_\_\_ Identify correct analysis
- \_\_\_\_\_ Ensure methods match purpose

#### Results – 6 points

- \_\_\_\_\_ Report results specific to analysis
- \_\_\_\_\_ Report results that match purpose
- \_\_\_\_\_ Provide graph

#### Conclusion – 6 points

- \_\_\_\_\_ Discuss practical implications of results
- \_\_\_\_\_ Report similarities or dissimilarities to other articles
- \_\_\_\_\_ Report errors in data collection

#### Aesthetics – 6 points

- \_\_\_\_\_ Present professional power point (appearance)
- \_\_\_\_\_ Present solid oral presentation



APA – 6 points

\_\_\_\_\_APA format followed on citations in text

\_\_\_\_\_APA format followed on references



#### Appendix 4: Motor Development Exam Questions

Objective 1 - Demonstrate knowledge of the developmental process throughout the lifespan.

##### Exam Questions

1. Proximodistal refers to growth in the human body that proceeds from the
  - a. Feet toward the head
  - b. Head toward the feet
  - c. Center or midline toward the periphery of the body (limbs)**
  - d. Periphery (limbs) toward the center or midline of the body
2. Cephalocaudal refers to growth in the human body that proceeds from the
  - a. Feet toward the head
  - b. Head toward the feet**
  - c. Center or midline toward the periphery of the body (limbs)
  - d. Periphery (limbs) toward the center or midline of the body

Objective 2 – Discuss the interaction of cognitive and motor development throughout the lifespan.

##### Exam Questions

1. About 20 percent of adult stature is attained during this 2.5 to 3-year period
  - a. Birth
  - b. Year 3 to 5
  - c. 18 years of age
  - d. Adolescence**
2. Which of the following growth spurts is considered “non-universal” (not everyone experiences it)?
  - a. Birth growth spurt
  - b. Mid-growth spurt**
  - c. Adolescent growth spurt
  - d. None of the above

Objective 3 – Characterize prenatal development concerns.

1. Which of the following measurements of maturity is the most widely accepted for determining the stage of maturation?
  - a. Genitalia maturity
  - b. Skeletal age/maturity**
  - c. Age of menarche
  - d. None of the above
2. At which point does an infant actually lose up to 10 percent of its weight?
  - a. First six months
  - b. 1-3 days after birth**
  - c. 10 days after birth
  - d. Year



Objective 4– Discern the components of basic fundamental movement patterns.

Exam Questions

1. There are three major categories of early voluntary movements. Which one involves head control, body control, and upright posture?
  - a. **Stability**
  - b. Locomotion
  - c. Manipulation
  - d. None of the Above
2. Which of the following stages from the Total Body Approach of galloping is considered Stage 3 or experienced?
  - a. The pattern resembles a rhythmically uneven run with the performer often reverting to the traditional running pattern. The tempo tends to be relatively fast and the rhythm inconsistent. The trail leg crosses in front of the lead leg during the airborne phase and remains in front at contact.
  - b. The pattern is smooth, rhythmical, and executed at a moderate tempo. The trail leg moves in front of, adjacent to, or behind the lead leg during the airborne phase but is always adjacent to or behind the lead leg at contact. The trail leg is extended during the airborne phase, often causing the trail foot to turn out and the lead leg to flex at less than or equal to 45 degrees.
  - c. **The pattern is smooth, rhythmical, and executed at a moderate tempo. The trail leg may cross in front of or move adjacent to the lead leg during the airborne phase but is placed adjacent to or behind the lead leg at contact. Both the lead and trail legs are flexed at less than or equal to 45 degrees with the feet carried close to the surface during the airborne phase.**
  - d. None of the above
3. Which phase of throwing is described – “consists of all movements directed away from the intended line of projection”?
  - a. **Preparatory phase**
  - b. Execution phase
  - c. Follow-through phase
  - d. None of the above

Objective 5 - Measure children for appropriate growth and development traits.

Exam Questions

1. A weight-to-height ratio, calculated by dividing one's weight in kilograms by the square of one's height in meters and used as an indicator of obesity and underweight.
  - a. Body fat percentage
  - b. Muscle mass
  - c. Body proportions
  - d. **Body Mass Index**
2. Which of the two choices is the better indicator of maturity?
  - a. **Developmental Age**



- b. Chronological Age
- 3. \_\_\_\_\_ of Reaching and Grasping differentiates reaching and grasping, two-handed reaching, visual initiation and guidance of the reach, tactile control of the grasp?
  - a. **Phase I**
  - b. Phase II

Objective 6 – Define health-related fitness and its effect on physiological performance.

Exam Questions

- 1. The amount of blood that can be pumped out of the heart in 1 minute is
  - a. Stroke Volume
  - b. **Cardiac Output**
  - c.  $VO_2$  max
  - d. Heart rate
- 2. The largest amount of oxygen a human can consume at the tissue level is
  - a. Stroke Volume
  - b. Cardiac Output
  - c.  **$VO_2$  max**
  - d. Heart rate



## **Appendix 5: Motor Development Syllabus**

### **Tennessee Tech University Exercise Science 3410-001 Motor Development Fall 2021**

**Instructor:** Christina Turnbow  
**Credits:** 3

#### **Course Description:**

The purpose of this course is to understand and document physical, maturational, and developmental changes across the lifespan. Students will be exposed to fundamental movement patterns of children and use assessments to detect motor delays. Content will also address development changes in adulthood and older adulthood.

#### **Required Texts:**

Haywood, K. M., & Getchell, N.G., (2020). *Lifespan Motor Development*. (7<sup>th</sup> Ed.). Human Kinetics

#### **Objectives of the Course:**

By the end of the semester, the student should be able to:

**1. Demonstrate knowledge of the developmental process throughout the lifespan.**

\*Identify prominent researchers who have contributed significantly to our understanding of the developmental process.

**2. Discuss the interaction of cognitive and motor development throughout the lifespan.**

**3. Describe the socialization process and its effect on motor development.**

\*Identify key points of interaction between motor and moral development.

\*Characterize prenatal developmental concerns.

**4. Discern the components of basic fundamental movement patterns.**

\*Report the effects of youth sports on development.

\*Assess motor performance in children and adults.

**5. List and describe common motor delays and their relationship to motor development.**

**6. Define health-related fitness and its effect on physiological performance.**

\*Measure children for appropriate growth and development traits.

\*Plan and conduct an effective motor development program for people of any age.

#### **Major Teaching Methods:**

This course utilizes lecture, small group discussion techniques, and class activities when applicable. The classroom activities for this course consist of a variety of teaching methods including direct instructional approach (lecture), co-operative learning, individualized instruction, audio-visual presentations, videos, project presentations, and guest presentations. Other techniques including assigned readings, homework assignments, computer exercises may be utilized to learn and apply class material. (Subject to change as necessary)

#### **Topics Covered:**

**I. An Overview of Development**

- A. Introduction to Motor Development
- B. Cognitive and Motor Development



- C. Social and Motor Development
- D. Moral and Motor Development
- II. Factors That Affect Development
  - A. Prenatal Development Concerns
  - B. Effects of Early Stimulation and Deprivation
- III. Physical Changes Across the Lifespan
  - A. Growth and Maturation
  - B. Physiological Changes: Health-Related Physical Fitness
  - C. Movement and the Changing Senses
- IV. Movement Across the Lifespan
  - A. Infant Reflexes and Stereotypies
  - B. Voluntary Movements of Infancy
  - C. Fine Motor Development
  - D. Fundamental Locomotion Skills of Childhood
  - E. Fundamental Object-Control Skills of Childhood
  - F. Youth Sports
  - G. Developmental Motor Delays
  - H. Movement in Adulthood
- V. Assessing Motor Development and Implementing a Program

**Grading & Evaluation Procedures:**

1. Quizzes (multiple choice, short-answer) and exams (multiple choice) will be used to assess student ability to:
  - a. Describe and differentiate growth, maturation, and development
  - b. Assess growth data
  - c. Assess developmental states of locomotor and manipulative skills
2. Quizzes may be given at the option of the instructor to ensure that all students are reading the assigned materials and are prepared to participate in class discussions. Quizzes may be announced in advance or may be unannounced “pop quizzes”.
3. Students will also be evaluated on in-class activities and discussions that will require them to apply concepts from the textbook and/or other reading materials.
4. A motor function assessment project will be used to assess student ability to:
  - a. Measure and evaluate motor functioning of a child, adult, or older adult
5. All grades will be posted on iLearn and kept up-to-date during the semester.
  - a. It is the student’s responsibility to review grades on a weekly basis for accuracy.
  - b. The grading scale will not be curved.
6. Mid Term and Final Exam