Note:

Course content may be changed, term to term, without notice. The information below is provided as a guide for course selection and is not binding in any form, and should <u>not</u> be used to purchase course materials.

LIBERTY UNIVERSITY.

COURSE SYLLABUS

EXSC 550

ADVANCED BIOMECHANICAL ANALYSIS

COURSE DESCRIPTION

This course involves the application of mechanical principles, quantitative analysis of human movement, and advanced study of biomechanical instrumentation systems. Critical analysis of current research in the field of biomechanics is also emphasized.

RATIONALE

The purpose of this course is to provide future clinicians and researchers in exercise science with an extensive knowledge base of the principles, theories, and concepts concerning quantitative analysis of human movement. This course will prepare the student to both utilize and analyze video, force, and electromyographic data in EXSC 551, Advanced Biomechanics Lab, and in his/her future exercise science career. In addition, the student will also enhance his/her analytical skills through biomechanical research evaluation and review.

I. PREREQUISITE

For information regarding prerequisites for this course, please refer to the Academic Course Catalog.

II. REQUIRED RESOURCE PURCHASE

Click on the following link to view the required resource(s) for the term in which you are registered: http://bookstore.mbsdirect.net/liberty.htm

III. ADDITIONAL MATERIALS FOR LEARNING

A. Computer with basic audio/video output equipment

B. Internet access (broadband recommended)

C. Blackboard recommended browsers

D. Microsoft Office

IV. MEASURABLE LEARNING OUTCOMES

Upon successful completion of this course, the student will be able to:

A. Describe the systems of instrumentation used in biomechanical research.

B. Differentiate the components of planar and three-dimensional kinematics in relationship to human movement and video analysis.

C. Differentiate the components of planar and three-dimensional kinetics in relationship to human movement.

D. Describe the process of kinetic data collection and analysis using force plates.

E. Describe the process of EMG data collection and analysis of waveform data.

F. Select, analyze, and critically evaluate biomechanical research.

V. COURSE REQUIREMENTS AND ASSIGNMENTS

A. Textbook readings and lecture presentations

B. Course Requirements Checklist

After reading the Course Syllabus and Student Expectations, the student will complete the related checklist found in Module/Week 1.

C. Discussion Board Forums (2)

Discussion boards are collaborative learning experiences. Therefore, the student is required to create a thread in response to the provided prompt for each forum. Each thread must be at least 500 words, demonstrate course-related knowledge, and provide a total of 2 citations from any of the following sources: peer-reviewed journal articles, published textbooks, or publications directly associated with the content being discussed. In addition to the thread, the student is required to reply to 2 other classmates' threads. Each reply must be at least 250 words, engage with course-related knowledge, and include at least 1 citation from any of the following sources: peer-reviewed journal articles, published textbooks, or published books directly associated with the content being discussed.

D. Article Reviews (3)

Each student will write 3 article reviews that utilize biomechanical tools discussed in this course. Each article review will be at least 2 pages (double spaced, 12-point font) and consist of a summary of the introduction, methods, results, and discussion sections of the article.

E. PowerPoint Project

The student will compose a 15-slide PowerPoint presentation on the quantitative biomechanical analysis of a chosen sport skill or technique. It may be a strength and conditioning skill/technique, as well. Each slide's notes section must contain at least 75 words, and the final slide must include at least 4 references in addition to the course textbook and the Bible.

F. Exams (4)

Each exam will cover the Reading & Study material for the modules/weeks in which it is assigned. Each exam will be open-book/open-notes; contain short answer, true/false, multiple-choice, and/or essay questions; and have a 1-hour and 15-minute time limit.

VI. COURSE GRADING AND POLICIES

A. Points

Course Requirements Checklist		10
Discussion Board Forums (2 at 75 pts ea)		150
Article Reviews (3 at 50 pts ea)		150
PowerPoint Project		100
Exams (4 at 150 pts ea)		600
	Total	1010

B. Scale

A = 940–1010 A- = 920–939 B+ = 900–919 B = 860–899 B- = 840–859
C+ = 820–839 C = 780–819 C- = 760–779 D+ = 740–759 D = 700–739
D- = 680–699 F = 0–679

C. Disability Assistance

Students with a documented disability may contact Liberty University Online's Office of Disability Accommodation Support (ODAS) at LUOODAS@liberty.edu to make arrangements for academic accommodations. Further information can be found at www.liberty.edu/disabilitysupport.

If you have a complaint related to disability discrimination or an accommodation that was not provided, you may contact ODAS or the Office of Equity and Compliance by phone at (434) 592-4999 or by email at equityandcompliance@liberty.edu. Click to see a full copy of Liberty's Discrimination, Harassment, and Sexual Misconduct Policy or the Student Disability Grievance Policy and Procedures.

COURSE SCHEDULE

EXSC 550

Textbooks: Johnson & Bauer, *Dynamic Biomechanics* (2015).
Liberty University Custom, *Advanced Biomechanical Analysis* (2016).

MODULE/ WEEK	READING & STUDY	ASSIGNMENTS	POINTS
1	Johnson & Bauer: chs. 1–2 2 presentations	Course Requirements Checklist Class Introductions DB Forum 1	10 0 75
2	Johnson & Bauer: ch. 3 4 presentations 1 PDF 2 websites	Exam 1	150
3	Johnson & Bauer: chs. 5, 7 *Advanced Biomechanical Analysis*: pp. 9–19, 24–32 4 presentations 4 websites	Article Review 1	50
4	Johnson & Bauer: chs. 6, 8 *Advanced Biomechanical Analysis*: pp. 92–108 4 presentations	Exam 2	150
5	*Advanced Biomechanical Analysis*: pp. 179–201 2 presentations 4 websites	DB Forum 2	75
6	*Advanced Biomechanical Analysis*: pp. 279–289, 291–297, 317–319, 321–322, 327, 336 3 presentations	Article Review 2 Exam 3	50 150
7	Johnson & Bauer: ch. 9 *Advanced Biomechanical Analysis*: pp. 35–39, 50–55 4 presentations 1 graphic 2 websites	Article Review 3	50
8	Johnson & Bauer: ch. 10 2 presentations 2 websites	PowerPoint Project Exam 4	100 150
		TOTAL	**1010**

DB = Discussion Board

NOTE: Each course module/week begins on Monday morning at 12:00 a.m. (ET) and ends on Sunday night at 11:59 p.m. (ET). The final module/week ends at 11:59 p.m. (ET) on **Friday**.