

Applied Data Science & Analytics in Human Performance

PET5936 – 19432 ~ 3 CREDITS ~ SUMMER C 2021

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OFFICE HOURS: Virtual office hours by appointment when scheduled at
least 1 business day in advance.

ACCESS: Access course through Canvas on **UF e-Learning** (<https://elearning.ufl.edu/>) & the **Canvas** mobile app by **Instructure**. This is a fully online course, so there are no in-person meetings. Lectures are pre-recorded so that you may watch them on-demand; please refer to the “Course Schedule” below for the suggested timeline to follow.

COURSE DESCRIPTION: Examines fundamental concepts related to the acquisition, analysis, and interpretation of data relevant to the outcome of human performance across myriad physical and cognitive domains including sport, exercise, tactical operations, and medical professions. Addresses the use of statistics and broader fields of data science, artificial intelligence, analytics, and technology management necessary to evaluate performance and strategically adjust training methods to enhance human performance, health, and well-being. Content will aid students preparing to sit for the National Strength and Conditioning (NSCA) Certified Performance and Sport Scientist (CPSS) exam.

PREREQUISITE KNOWLEDGE AND SKILLS: Undergraduate degree. Some background in math and science. Introductory statistics is not required but is helpful. Students enrolling in this course must have sufficient technical skills access and navigate the Canvas learning management system, e-mail with attachments, Microsoft Office, Zoom videoconferencing, downloading, installing, and updating software to Google Chrome.

REQUIRED MATERIALS:

Textbook: French, D. and Ronda, L.T. (Eds). *NSCA's Essentials of Sport Science*. Human Kinetics. 2022. ISBN: 9781492593355

The following research articles are provided to the student within the Canvas course page

1. Ward, P. et al. *Business Intelligence: How Sport Scientists Can Support Organization Decision Making in Professional Sport*. *Int J Sport Phys and Perf*. 2019, 14 (p544-546)
2. Adesida, Y., et al. *Exploring the Role of Wearable Technology in Sport Kinematics and Kinetics: A Systematic Review*. *Sensors*. 2019, 19 (1597).
3. Scott, M., et al. *The Validity and Reliability of Global Positioning Systems in Team Sport: A Brief Review*. *J Str Cond Res*. 30(5), 1470-1490.
4. Chavda, S., et al. *Force-Time Characteristics of the Countermovement Jump: Analyzing the Curve in Excel*. *Str Cond J*. 2018, 40(2), 67-77.
5. Mateus, N., et al. *Clustering performance in European Basketball According to Players' Characteristics and Contextual Variables*. *Int J Sport Sci Coach*, 15(3), 405-411.
6. Carey, D., et al. *Predictive modeling of training loads and injury in Australian football*. *Int J Comp Sci Sport*, 17(1), 49-66.
7. Bonidia, R.P., et al. *Data mining in sports: A systematic review*. *IEE Latin Amer Transactions*. 2018, 16(1), 232-239.
8. Schneider, et al. *Heart rate monitoring in team sports – a conceptual framework for contextualizing heart rate measures for training and recovery prescription*. *Front Phys*, 9, 639.

COURSE LEARNING OBJECTIVES: Upon completion of this course, students will be able to:

1. Identify the aspects of sports improved with technological implementation
2. Describe principles of good data hygiene
3. Explain the characteristics of tracking and load monitoring systems
4. Describe the protocols used to collect data with relevant sport science technology
5. Analyze data collected with relevant sport science technology
6. Interpret the results of data analyzed from relevant sport science technology
7. Recommend strategies to improve athlete health, well-being, or performance based on the interpretation of data analyses.
8. Develop material to disseminate data analyses and subsequent recommendation

COURSE AND UNIVERSITY POLICIES:

ATTENDANCE POLICY: Requirements for class attendance (participation) and make-up exams, assignments, and other work in this course are consistent with university policies <https://catalog.ufl.edu/ugrad/current/regulations/info/attendance.aspx>.

EXAM & ASSIGNMENT MAKE-UP POLICY: Unless excused based on University policies (<https://catalog.ufl.edu/ugrad/current/regulations/info/attendance.aspx>), missed examinations and non-submitted or late assignments will be not be evaluated and will be assigned a grade of 0.

Obtaining approval for make-up exams or make-up assignments is the responsibility of the student. Students with medically or emergency related circumstances should utilize the UF Care Team's Contact My Instructor service (<https://care.dso.ufl.edu/instructor-notifications/>) provided by the UF Dean of Students Office.

Any non-medical or emergency related circumstances require students to submit a written request explaining why an exception is being requested. The written request must include official documentation that provides proof that the missed coursework was due to acceptable reasons outlined by University policy.

PERSONAL CONDUCT POLICY: Students are expected to exhibit behaviors that reflect highly upon themselves and the University. UF students are bound by The Honor Pledge which states:

We, the members of the University of Florida community, pledge to hold ourselves and our peers to the highest standards of honor and integrity by abiding by the Honor Code.

On all work submitted for credit by students at the University of Florida, the following pledge is either required or implied:

On my honor, I have neither given nor received unauthorized aid in doing this assignment.

The Honor Code (<http://www.dso.ufl.edu/sccr/process/student-conduct-honor-code/>) specifies a number of behaviors that are in violation of this code and the possible sanctions. Students are obliged to report any condition that facilitates academic misconduct to appropriate personnel. If you have any questions or concerns, please consult the instructor, graduate assistant, or teaching assistant in this class.

COPYRIGHT STATEMENT: The materials used in this course are copyrighted. Course content is the intellectual property of Diba Mani, Blain Harrison, Garrett Beatty, and property of the University of Florida. Course content may not be duplicated in any format without explicit permission from the College of Health and Human Performance and UF. Course content may not be used for any commercial purposes. Individuals violating this policy may be subject to disciplinary action or legal litigation from the University.

ACCOMMODATING STUDENTS WITH DISABILITIES: Students requesting accommodation for disabilities must first register with the Dean of Students Office (<http://www.dso.ufl.edu/drc/>). The Dean of Students Office will provide documentation to the student who must then provide this documentation to the instructor when requesting accommodation. You must submit this documentation prior to submitting assignments or taking the quizzes or exams. Accommodations are not retroactive, therefore, students should contact the office as soon as possible in the term for which they are seeking accommodations.

COURSE EVALUATIONS: Students in this class are participating in GatorEvals. This evaluation system is designed to be more informative to instructors so that teaching effectiveness is enhanced and to be more seamlessly linked to UF's CANVAS learning management system. Students can complete their evaluations through the email they receive from GatorEvals, in their Canvas course menu under GatorEvals, or via <https://ufl.bluera.com/ufl/>. Thank you for serving as a partner in this important effort.

PRIVACY: Students engaging in this course will develop multimedia content including audio and video presentations that will be accessed by all members of the class. Our class sessions may also be audio/visually recorded for students in the class to refer back and for enrolled students who are unable to attend live. Students enrolled in this course are agreeing to have their video or audio content accessible to the members of this course, in this semester. Recordings will not be available to members outside of this course, or in future semesters. As in all UF courses, unauthorized recording and unauthorized sharing of recorded materials is prohibited. Students are prohibited from sharing any content from this course without first obtaining explicit, written consent from the University and the individuals identified within course content to be shared.

GETTING HELP:

HEALTH & WELLNESS:

- U Matter, We Care (<https://care.dso.ufl.edu/>): If you or a friend is in distress, please contact umatter@ufl.edu or call 352-392-1575
- Contact My Instructor Service: <https://care.dso.ufl.edu/instructor-notifications/>
- Counseling and Wellness Center: <https://counseling.ufl.edu/>, 352-392-1575
- Sexual Assault Recovery Services (SARS) - Student Health Care Center, 392-1161
- University Police Department, 392-1111 (or 9-1-1 for emergencies)
<http://www.police.ufl.edu/>

ACADEMIC RESOURCES:

- E-learning technical support, 352-392-4357 (select option 2) or e-mail to Learning-support@ufl.edu. <https://lss.at.ufl.edu/help.shtml>
- Career Connections Center, Reitz Union, 392-1601. Career assistance and counseling. <https://career.ufl.edu/>

- Library Support, <http://cms.uflib.ufl.edu/ask>. Various ways to receive assistance with respect to using the libraries or finding resources.
- Teaching Center, Broward Hall, 392-2010 or 392-6420. General study skills and tutoring. <http://teachingcenter.ufl.edu/>
- Writing Studio, 302 Tigert Hall, 846-1138. Help brainstorming, formatting, and writing papers. <http://writing.ufl.edu/writing-studio/>
- Student Complaints:
 - On-Campus Students: <https://sccr.dso.ufl.edu/policies/student-honor-code-student-conduct-code/>
 - On-Line Students: <http://distance.ufl.edu/student-complaint-process/>

INCLUSION, DIVERSITY, EQUITY, AND ACCESS (IDEA) RESOURCES: All individuals, irrespective of their gender, gender identity, gender expression, sexual identity, sexual orientation, race, ethnicity, religious affiliation, physical or mental ability, political affiliation, or any other perceived generalized differentiator, are welcome in this course. It is expected we treat each other with respect and as equals. Treat one another as you want to be treated so that we can have valuable discussions in this course. Intolerant, inflammatory, or insulting behavior or speech is not acceptable and may lead to dismissal from the course. Please do reach out for assistance regarding accommodations.

- For suggestions or concerns related to IDEA, please reach out to any of the following:
 - Dr. Leo Ferreira, APK IDEA Liaison, ferreira@hhp.ufl.edu
 - Dr. Rachael Seidler, APK Graduate Coordinator, rachaelseidler@ufl.edu
 - Dr. Joslyn Ahlgren, APK Undergraduate Coordinator, jahlgren@ufl.edu

GRADING:

Student learning will be evaluated through module quizzes, assignments, and two exams. Specific assignment details and grading rubrics will be provided on the course website

<https://lss.at.ufl.edu/>.

- **Quizzes (20%):** Each course module includes a multiple choice quiz aimed at guiding and enhancing engagement in learning opportunities.
- **Assignments (20%):** Each student will be graded on assignments throughout the course in which students will apply course concepts to actual human performance related data sets. Assignment tasks will include the acquisition, processing, cleaning, statistical analysis, interpretation, and presentation of relevant data sets.
- **Exams (55%):** Exams consist of 50 – 100 objective questions (multiple choice, matching, true/false) worth 1 point each. Questions will require the application of course material or knowledge of basic scientific principles covered throughout the course. Exam questions are generated by the course instructor and are randomly selected from a test bank. Students should prepare for the exam by completing all weekly course readings, watching all course lectures, consuming all course media, and completing and module quizzes prior to the exam.
 - Exam 1: Modules 1-6: 25%
 - Final Exam: Modules 1-12: 30%

Notes:

- Grades will not be rounded
 - e.g. a 92.99% will not be rounded to a 93.00%.
- Grades of “I”, “X”, “H”, or “N” will not be given except in cases of a documented, catastrophic occurrence.

<u>Grade</u>	<u>Percentage</u>	<u>Grade Points</u>
A	93 - 100 %	4.00
A-	90 - 92.99 %	3.67
B+	87 - 89.99 %	3.33
B	83 - 86.99 %	3.00
B-	80 - 82.99 %	2.67
C+	77 - 79.99 %	2.33
C	73 - 76.99 %	2.00
C-	70 - 72.99 %	1.67
D+	67 - 69.99 %	1.33
D	63 - 66.99 %	1.00
D-	60 - 62.99 %	0.67
E	0 - 59.99 %	0.00

Specific information on course assignments & UF grading policies:

- <https://catalog.ufl.edu/UGRD/academic-regulations/grades-grading-policies/>.

WEEKLY COURSE SCHEDULE:

Critical Semester Dates & UF Observed Holidays:

- May 31: Memorial Day (Monday)
- June 21 – 25: Mid-Summer Break (between Summer A & Summer B)
- July 5: Independence Day Observed.
- Complete list available here: <https://catalog.ufl.edu/UGRD/dates-deadlines/2021-2022/#summerac21text>

Week	Dates	Assigned Module & Schedule Notes	Assessments Due
1	May 10 - 14	Module 1 – Technology & Data in Human Performance Textbook Chapters: 7, 8	
2	May 17 - 21	Module 2 – Athlete Tracking Systems and Load Monitoring Textbook Chapters: 9, 10	May 17 Module 1 Quiz
3	May 24 - 28	Module 3 – Kinematics, Kinetics, Gait Analysis, & Force Platforms Textbook Chapters: 11, 12	May 24 Module 2 Quiz
4	May 31 – June 4	Module 4 – Strength Tracking & Analysis; HR & HRv Textbook Chapters: 13, 14	May 31 Module 3 Quiz
5	June 7 - 11	Module 5 – EEG, EMG, Biomarkers for Health & Performance Textbook Chapters: 15, 16	June 7 Module 4 Quiz
6	June 14 - 18	Module 6 – Perception of Effort and Subjective Monitoring Textbook Chapters: 17	June 14 Module 5 Quiz
7	June 21 - 25	Mid-Summer Break Exam 1 Window open June 21 – June 28	June 21 Module 6 Quiz
8	June 28 – July 2	Module 7 – Statistical Modeling Textbook Chapters: 18	June 28 Exam 1 Window Closes
9	July 5 – 9	Module 8 – Injury Risk Model Textbook Chapters: 19	July 5 Module 7 Quiz
10	July 12 – 16	Module 9 – Performance Interventions & Operationalizing Data Textbook Chapters: 22	July 12 Module 8 Quiz
11	July 19 – 23	Module 10 – Data Mining & Nonlinear Data Analysis Textbook Chapters: 20	July 19 Module 9 Quiz

12	July 26 – 30	Module 11 - Data Delivery & Reporting Textbook Chapters: 21	July 26 Module 10 Quiz
13	August 2 - 6	Module 12 – Information Dissemination Textbook Chapters: 31 Final Exam Window open July 31 – August 6	August 2 Module 11 Quiz August 6 Module 12 Quiz
Exams Proctored Online via <i>honorlock</i> Exams Available from 5:00am on first day – 11:59pm ET on final day of Exam Window			

SUCCESS AND STUDY TIPS:

Quizzes & Optional Study Guides are designed as preparation tools for the course exams. Learning is a process that requires sustained incremental advancements that occur over time following neural adaptation. More simply stated, cramming may yield short-term results, but this strategy does not induce meaningful or lasting learning.

Assignments are designed to facilitate skill development in retrieving, consuming, and communicating scientific evidence supporting chosen approaches to improve performance by leveraging psychological skills / theory.