

Applied Data Science & Analytics in Human Performance

PET5936 ~ 3 CREDITS ~ SUMMER C 2022

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OFFICE HOURS: Office Hours are by appointment on [zoom](#). You can schedule an appointment with me [here](#).

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

- Additional material from the UF Library and web sources will be assigned and available through the UF E-learning course shell.

COURSE FORMAT: The course is organized into 12 modules. Within each module, students will have the opportunity to engage in course content and graded learning activities. The learning activities are designed to catalyze student achievement of the following course goals and objectives:

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>.

Active participation in the course is mandatory. Students are permitted unlimited attempts on module practice assignments so that they may review any missed questions or prepare for quizzes and exams. Interaction with the course online Yellowdig discussion board is part of the final grade in the course.

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.

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 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.

COPYRIGHT STATEMENT: The materials used in this course are copyrighted. Course content is the intellectual property of Blain Harrison, 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 are expected to provide professional and respectful feedback on the quality of instruction in this course by completing course evaluations online via GatorEvals. Guidance on how to give feedback in a professional and respectful manner is available at <https://gatorevals.aa.ufl.edu/students/>. Students will be notified when the evaluation period opens and can complete evaluations through the email they receive from GatorEvals, in their Canvas course menu under GatorEvals, or via <https://ufl.bluera.com/ufl/>. Summaries of course evaluation results are available to students at <https://gatorevals.aa.ufl.edu/public-results/>.

PRIVACY: Students enrolled in this course are agreeing to have their video or audio content accessible to the members of this course, enrolled in this semester. All class meetings will be recorded and provided to the class for asynchronous access. Students engaging in this course will also develop multimedia content including audio and video presentations that will be accessible to all members of the class. Recordings will not be available to members outside of this course.

Per the State of Florida's House Bill 233, students are also permitted to record video or audio of class lectures. However, the purposes for which these recordings may be used are strictly controlled. The only allowable purposes are (1) for personal educational use, (2) in connection with a complaint to the university, or (3) as evidence in, or in preparation for, a criminal or civil proceeding. All other purposes are prohibited. Specifically, students may not publish recorded lectures without the written consent of the instructor.

A "class lecture" is defined as an educational presentation intended to inform or teach enrolled students about a particular subject, including any instructor-led discussions that form part of the presentation, and delivered by any instructor hired or appointed by the University, or by a guest instructor, as part of a University of Florida course. A class lecture does not include lab sessions, student presentations, clinical presentations such as patient history, academic exercises involving solely student participation, assessments (quizzes, tests, exams), field trips, private conversations between students in the class or between a student and the faculty or lecturer during a class session.

Publication without permission of the instructor is prohibited. To "publish" means to share, transmit, circulate, distribute, or provide access to a recording, regardless of format or medium, to another person (or persons), including but not limited to another student within the same class section. Additionally, a recording, or transcript of a recording, is considered published if it is posted on or uploaded to, in whole or in part, any media platform, including but not limited to social media, book, magazine, newspaper, leaflet, or third party note/tutoring services. A student who publishes a recording without written consent may be subject to a civil cause of action instituted by a person injured by the publication and/or discipline under UF Regulation 4.040 Student Honor Code and Student Conduct Code.

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:

GRADING SCALE: All course assignments are administered and graded within the PET5936 Canvas course page, so students will have access to all grades as they submit assignments. Any assignment that requires the instructor to manually grade some aspect of it will be graded within one week of its due date, including the semester exams. Final Grades will be rounded up at .5 and above. The table below provides a reference. More detailed information regarding current UF grading policies can be found here: <https://catalog.ufl.edu/UGRD/academic-regulations/grades-grading-policies/>. Any requests for additional extra credit or special exceptions to these grading policies will be interpreted as an honor code violation (i.e. asking for preferential treatment) and will be handled accordingly.

| Letter Grade | Percent of Total Points Associated with Each Letter Grade | GPA Impact of Each Letter Grade |
|--------------|---|---------------------------------|
| A | 92.5-100% | 4.0 |
| A- | 89.5 – 92.49% | 3.7 |
| B+ | 86.5-89.49% | 3.33 |
| B | 82.5-86.49% | 3.0 |
| B- | 79.5 – 82.49 | 2.7 |
| C+ | 76.5-79.49% | 2.33 |
| C | 72.5-76.49% | 2.0 |
| C- | 69.5 – 72.49 | 1.7 |
| D+ | 66.5-69.49% | 1.33 |
| D | 62.5-66.49% | 1.0 |
| D- | 59.5 – 62.49 | 0.7 |
| E | 0-59.49% | 0 |

| Evaluation Components | Course Objectives Met | Points Per Component | Weighted % of Total Grade |
|-------------------------|-----------------------|----------------------|---------------------------|
| Module Quizzes | 1-12 | 120 points | 20% |
| Yellowdig Participation | 1-12 | 100 points | 10% |
| Applied Assignments | 1-12 | 100 points | 10% |
| Article Synopses (x4) | 1-12 | 40 points | 10% |
| Midterm Exam | 1-12 | 100 points | 20% |
| Cumulative Final Exam | 1-12 | 100 points | 30% |

Module Quizzes - Each learning module contains a graded quiz consisting of 10 objective questions related to all components of the module. Quiz questions will be randomly selected from a question bank specific to each module. Each module quiz question bank contains multiple questions aligning with each individual module objective provided at the top of each learning module page in e-Learning. Quizzes are not timed; however, the Honorlock proctoring service is required to complete each quiz. Honorlock is included on the e-Learning platform and no additional downloads are required. All quizzes are available from the first day of classes, but each module has a due date corresponding to the end of the week of the module according to the course schedule. Specifically, quizzes are due by Monday at 2:59am EST (Sunday at 11:59pm PST) each week. Aligns with course objectives 1-12. Students are permitted 2 attempts on each module quiz with the highest score of the 2 attempts used in their final grade calculation. Students will be able to view missed questions on the first attempt, but not the correct answers. A different collection of questions are provided on the second attempt due to the random selection of questions from each of the involved question banks included in the quiz.

Yellowdig Participation - This course incorporates an application called Yellowdig that provides a social media-like discussion board providing opportunities for engagement, discussion, and reflection of course topics between classmates and the instructor. Points are earned for each interaction a student has with the Yellowdig platform. Students have the ability to earn a maximum total of 2,000 points each week in Yellowdig and the app sums the weekly totals throughout the semester to create a cumulative final point total. Students earning totals of 12,000 points or higher in Yellowdig by Saturday, August 6th at 2:59am EST will earn a score of "100" for the Yellowdig Participation assignment on Canvas. The percentage of total points out of 12,000 will be used as the grade for the Yellowdig Participation Assignment on Canvas for students earning less than 12,000 total points. Yellowdig is included within e-Learning, no additional downloads are required.

Artificial Intelligence Assignments – Each student will be graded on assignments throughout the course in which students will apply course concepts to actual human performance related datasets. Assignment tasks will include the acquisition, processing, cleaning, statistical analysis, interpretation, and presentation of relevant data sets.

Article Synopses - Students are expected to post a minimum of 4 research article synopses to the Yellowdig discussion board throughout the course. Each article synopsis requires students to search a relevant database of research journals (i.e. Google Scholar, SportDiscus, PubMed) to find a peer-reviewed research article related to one of the course topics for deeper reflection. Students should read the selected articles in their entirety and then post a brief synopsis of the article(s) to Yellowdig and to the corresponding assignment in e-Learning. The synopsis should be written and should include the following headers: 1. Reason for Selection 2. Research Problem

3. Methods 4. Results/Conclusions 5. Takeaways. Students should briefly summarize why they selected the article, what research problem was addressed in the article, how the experiment was conducted, the most important results and explanations for the results provided by the authors of the study, and what information from the article can be used by classmates in their strength and conditioning decision making processes. A pdf copy of the article should be uploaded to both the Yellowdig post and e-Learning assignment. The same written synopsis can be submitted to both Yellowdig and e-Learning.

Midterm Exam – The midterm exam consists of 50 objective questions (multiple choice, matching, true/false) worth **2 points** each. Questions will require the application of course material or knowledge of basic scientific principles covered within each of the first 6 learning modules. Exam questions are generated by the course instructor and are randomly selected from the first 6 module quiz question banks. Students should prepare for the exam by completing all weekly course readings, practice activities, and module quizzes prior to the exam. The exam is not timed; however, the Honorlock proctoring service is required to complete it. Honorlock is included on the e-Learning platform and no additional downloads are required. **ONE** attempt is allowed on the midterm exam. Bonus points earned from the submission of extra credit practice questions (see “Extra Credit” below) are added to the exam score following the due date. The exam will be available for one week following Module 7 in the course schedule and is due Monday, June 27 at 2:59am EST (Sunday, June 26 at 11:59pm PST).

Final Exam - The final exam will consist of 50 objective questions (multiple choice, matching, true/false) worth **2 points** each. Questions will require the application of course material or knowledge of basic scientific principles covered within each of the final 6 learning modules. Exam questions are generated by the course instructor and are randomly selected from Modules 7 - 12 question banks. Students should prepare for the exam by completing all weekly course readings, practice activities, and module quizzes prior to the exam. The exam is not timed; however, the Honorlock proctoring service is required to complete it. Honorlock is included on the e-Learning platform and no additional downloads are required. **ONE attempt** is allowed on the final exam. In the event that the “raw” final exam score (i.e. the score without any bonus points added) is higher than the midterm exam score (including added bonus points), the raw final exam score will replace the midterm score when calculating the final grade in the course. Bonus points earned from the submission of extra credit practice questions (see “Extra Credit” below) are added to the exam score following the due date. The exam will be available for one week following Module 14 in the course schedule and is due Saturday, August 6th at 2:59am EST (Friday, August 5th at 11:59pm PST).

Module Activities – An ungraded practice quiz is available in each of the 12 learning modules. Links to the practice quizzes are under the "Practice" header on the module learning pages. The practice quizzes correspond to the learning material in the module. They may be completed an unlimited number of times, Honorlock is not required, and questions and answers are viewable between attempts. All practice quizzes are available from the first day of the course and there are no due dates. These are optional assignments designed to help students gauge their comprehension and application of course learning material as it pertains to stated course objectives. Scores earned from any practice quiz DO NOT affect a student's final grade in any way.

Extra Credit – This course includes 3 extra credit opportunities:

- Each learning module contains an extra credit practice-questions assignment. The assignment involves students creating up to 2 practice questions from the module's learning material for inclusion within the practice question banks in the course. Each new question created is worth 0.5 bonus points to be added to the next closest exam to the module (either the midterm or the final exam) for a maximum of 6 bonus points that could be added to these exams, respectively. Extra credit assignments are due at 11:59pm EST on Fridays at the end of the week the module is assigned in the course schedule.
- Students earning the maximum amount of points available in Yellowdig by the last day of classes will earn 1 bonus point that will be added to their final overall grade.
- Students who include one multiple choice question related to an article synopsis they post to Yellowdig will receive one bonus point to be added to a low module quiz score at the end of the semester. Students who answer multiple choice questions related to article synopses on Yellowdig will also earn one bonus point to be added to a low module quiz score at the end of the semester. A maximum of **10 bonus points** to be added to module quiz scores can be earned from this opportunity.

***Note Regarding Program Comprehensive Exam** – If you choose PET5936 as one of the courses to include within your comprehensive exam, know that the exam will contain 60 objective questions (multiple choice, true/false, matching) that are pulled at random from a question bank similar to the quizzes and exams in this course. If you complete the exam in a future semester, you will be able to access this PET5936 Canvas course and review lecture videos and exam questions and answers. If you complete the exam during this semester, you will need to work ahead in the course to ensure you have been introduced to all of the topics that are found on it. All modules and assignments are available from the first week of the course. I recommend completing the practice quizzes in each module as many times as needed to gain practice with course content not yet covered by the time you take the exam.

WEEKLY COURSE SCHEDULE:

| Week | Dates | Assigned Module & Schedule Notes | Assessments Due |
|------|---------------------|--|---|
| 1 | May 9 - 15 | Module 1 – Technology & Data in Human Performance Textbook Chapters: 7, 8 | May 15 Module 1 Quiz |
| 2 | May 16 - 22 | Module 2 – Athlete Tracking Systems and Load Monitoring Textbook Chapters: 9, 10 | May 22 Module 2 Quiz AI Project Assignment 1 |
| 3 | May 23 - 29 | Module 3 – Kinematics, Kinetics, Gait Analysis, & Force Platforms Textbook Chapters: 11, 12 | May 29 Module 3 Quiz, |
| 4 | May 30 – June 5 | Module 4 – Strength Tracking & Analysis; HR & HRv Textbook Chapters: 13, 14 | June 5 Module 4 Quiz |
| 5 | June 6 - 12 | Module 5 – EEG, EMG, Biomarkers for Health & Performance Textbook Chapters: 15, 16 | June 12 Module 5 Quiz, AI Project Assignment 2 |
| 6 | June 13 - 19 | Module 6 – Perception of Effort and Subjective Monitoring Textbook Chapters: 17 | June 19 Module 6 Quiz |
| 7 | June 20 - 26 | Mid-Summer Break Exam 1 Window open June 18 – June 27 | June 26 Exam 1 Window Closes |
| 8 | June 27 – July 3 | Module 7 – Statistical Modeling Textbook Chapters: 18 | July 3 Module 7 Quiz, AI Project Assignment 3 |
| 9 | July 4 – 10 | Module 8 – Injury Risk Model Textbook Chapters: 19 | July 10 Module 8 Quiz |
| 10 | July 11 – 17 | Module 9 – Performance Interventions & Operationalizing Data Textbook Chapters: 22 | July 17 Module 9 Quiz AI Project Assignment 4 |
| 11 | July 18 – 24 | Module 10 – Data Mining & Nonlinear Data Analysis Textbook Chapters: 20 | July 24 Module 10 Quiz |
| 12 | July 25 – 31 | Module 11 - Data Delivery & Reporting Textbook Chapters: 21 | July 31 Module 11 Quiz AI Project Assignment 5 |
| 13 | August 1 - 5 | Module 12 – Information Dissemination Textbook Chapters: 31 Final Exam Window open July 30 – August 5 | August 5 Module 12 Quiz AI Project Assignment 6 Final Exam |

Exams Proctored Online via *honorlock*
Exams Available from 12:00am on first day – 2:59am EST 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.