You will be required to write a 2500 lab report on cardiovascular fitness testing and its modalities (i.e. treadmill vs cycle ergometer). In your results analysis, you will need to:
1. Compare the difference in VO2 max (either averaging the Treadmill and Cycle data or pick one modality to do the comparison) between gender.
2. Compare the difference in VO2 max between modalities (treadmill vs cycle ergometer)
3. Compare the data value between submaximal testing and maximal testing.

You are asked to present the results of the lab sessions looking at max and sub-max predictors of VO2max, as well as gender differences. You need to select the most appropriate statistical analysis to use and present the finding in scientific fashion. You must also discuss the results using literature to support your comments.

**Some Issues To Think About When Writing The Report**.

1. **Gender Differences: Maximal Tests (ignoring submax data):** Are there any differences in predicted maximal oxygen uptake values between males and females when comparing results from the maximal treadmill test or when comparing results from the maximal cycle ergometer test? If so what physiological factors may be responsible for any gender differences noted?

To determine any gender differences you will need to run a series of independent sample t-tests**\***:

 One for maximal treadmill data for males and females

*and*

 One for maximal cycle ergometer data for males and females

1. **Maximal Tests: Exercise Mode Differences i.e. bike *vs.* treadmill (ignoring gender):** Are there any differences between results obtained from the maximal treadmill test compared to those obtained from the maximal cycle ergometer test? If so, what factors could be responsible for any differences observed?

In this instance you **do not** separate male and female data. Instead you run a paired sample t-test**\*** using all data collected from the maximal treadmill test and all data collected from the maximal cycle ergometer test

1. **Maximal Tests vs. Submaximal Tests i.e. max bike *vs.* submax bike and max treadmill *vs.* submax tredmill (ignoring gender)** Are there any differences between results obtained from the submaximal treadmill tests compared to the maximal treadmill test? Are there any differences observed between results obtained from the submaximal cycle ergometer test compared to the maximal cycle ergometer test? Again, if so explain possible reasons.

Again, in this instance you **do not** separate male and female data. Instead you run a paired sample t-test using all data collected from the maximal treadmill test and all data collected from the submaximal treadmill tests, and all data collected from the maximal cycle ergometer test is compared with all data collected from the submaximal cycle ergometer test

 e.g. maximal treadmill *vs.* submaximal walking

 maximal treadmill *vs.* submaximal jogging

 maximal cycling test *vs*. submaximal cycling test

**\*** An **independent sample t-test** is used when you are comparing data from ***two separate/different*** groups. In this instance you are comparing males to females

**\*** A **paired sample t-test** is used when you are comparing the ***same group*** of subjects who have done two different tests. In this instance all subjects who did both the maximal treadmill test and the maximal cycle ergometer test

If you analyse all the data as suggested above in your results section you should have figures or tables of the following:

1. Gender comparison: max bike and max treadmill
2. Mode of exercise comparison: Max treadmill *vs.* max bike
3. Max *vs*. submax comparison: Max treadmill *vs*. submax walking and submax jogging
4. Max *vs*. submax comparison: Max bike *vs.* submax bike

**Remember: do not offer explanations for your findings in the results section - leave that for the discussion. The only text that should be in the results section is text which reports what is being presented in the figures/tables and what can be seen from it.**

**FORMAT**

There is a rigid format to be followed in laboratory report writing which should include the following sections in their respective orders;

•  Title Page

•  Abstract

•  Introduction

•  Methods (which Can be further divided into sub-sections of, Subjects, Procedure, Data

Analysis)

•  Results

•  Discussion

•  References

•  Appendix (optional)

**TITLE PAGE**

Centred in upper and lower case letters.

Title should indicate the central research question, and should generally include something about the variable that was manipulated, and the dependent variable.

You should also include the module code and title, date of submission and your matriculation number. DO NOT include your name!

**ABSTRACT**

New page with the word “Abstract” centred.

One block of text with no indentations and no paragraphs.

Brief overview of the whole study, not step by step.

No abbreviations within the abstract.

Between 100 and 150 words in length (however this will depend on individual module leader discretion).

Watch verbosity and length.

No quotes.

Do not evaluate.

Each sentence needs to be maximally informative. Watch your use of words.

DO NOT include information that does not appear in the body of the paper. So it would be advantageous to write this section after the rest of the paper.

**ASK YOURSELF**

What was the problem (include the hypothesis)?
Who were used as the subjects, how many were there? What was their type, age, gender?
What did you do?
How did you do it?
What inferential statistics did you use?
Were the results significant?
What was the overall conclusion of the study?

**HELPFUL STARTING SENTENCES**

This experiment was conducted to examine, (test)..... The subjects were randomly allocated.....
On completion of the pre-tests.....
significant differences were found.....

This researcher investigated the relationship between..... The relationship between..... was investigated.....
It was hypothesised that.....
Forty six males and females divided into two groups..... Results suggested.....

The effects of.....

**INTRODUCTION**

New page.

Introduction needs to flow logically and smoothly, with each sentence and paragraph logically joined to the next.

Maintain objectivity (do not get emotionally involved).

Note any differences of opinion of previous research.

Finish the introduction by presenting the purpose of the study and rationale of the study (i.e., the purpose is what you’re doing, and the rationale is why you’re doing it – based on previous research or theory).

Spell out the hypothesis, last of all.

**ASK YOURSELF**

What is the problem I am investigating?
How does the study relate to previous research (include re ferences to this)? What is the purpose of the study (Why am I doing this study)?
How does the hypothesis relate to the study?
What results do I expect?

**HELPFUL STARTING SENTENCES**

The purpose of this experiment was..... Research carried out by.....
Their results found a significant improvement..... Other research found.....
The hypothesis of the experiment.....
The present paper.....
In spite of.....
Some research has examined.....
The researchers were also interested in..... None of these previous studies.....
In addition to.....

**METHODS**

No new page, follows the end of the introduction. The word methods is aligned to the left.

Methods section is divided into three sub-sections; Subjects (who); Procedure (what and how); Data analysis (what and how data was analysed).

**SUBJECTS**

No new page required.
The word “Subjects” is left justified.

**INCLUDE**

Who you used as subjects.
How were they selected.
How many in total (*N*=.....).
How many in each group (n=.....). The mean ages.

How many of each gender.
Mention any specific details of the subjects which may be relevant to the study.

**HELPFUL STARTING SENTENCES**

The experiment consisted of.....
The average age.....
Subjects were 37 first year sports and exercise science students..... Thirty seven first year sports and exercise science students.....

**PROCEDURE**

Follows subjects.
The word “Procedure” is left justified.

A step-by-step summary of the experiment as well as equipment used, should be set out so the reader can replicate the report.

No need to say how the subjects were randomly selected, just that they were. Make it flow and use PAST tense.

**ASK YOURSELF**

What were the subjects told about the experiment? What was read to the subjects?
What was presented, in what order and for how long? At what point were the subjects divided and how? What was the independent variable?

How was the experiment data recorded?
What pieces of equipment were used and when were they used?

**HELPFUL STARTING SENTENCES**

The subjects were randomly divided into two groups, a control group, which consisted of..... All subjects received two pre-tests.....
Each pre-test consisted of.....
On completion of.....

**DATA ANALYSIS**

No new page required.
The word “Data Analysis” is left justified.

A step-by-step summary of the data collected as well as the statistical tests conducted should be set out so the reader can replicate the report.

**ASK YOURSELF**

What were the results collected?
What statistical analysis tests used and when were they used? How did I record the results?
How did I analyse them?

**HELPFUL STARTING SENTENCES**

All pre and post tests were entered into.....
The recall scores were analysed with a (4 way) Analysis of Variance (ANOVA).....

**RESULTS**

Follows methods section, no new page. The word “Results” is aligned to the left.

Raw scores are not mentioned in results, but may be put into the appendix and referred to in results. (i.e. see Appendix A for raw scores).

Report results obtained, DO NOT evaluate results in this section.

Include group means (or other descriptive statistics).

Only include results that you refer to in the discussion.

A place to begin is with a description of the major dependent variables (that which you were trying to predict, followed by a written description of the statistical results).

Refer to the tables/figures within the text.
Write out the inferential results in text. E.g., It was expected that groups A and B would differ

considerably. This belief was supported by the result, F (1,16) = 16.82, *p*<0.05.

**ASK YOURSELF**

What were the descriptive statistics obtained (Mean)?
Are the descriptive statistics complex enough to need to be reported in a table/graph? What were the inferential statistical results?

**HELPFUL STARTING SENTENCES**

The difference was found to be significant.....
An unplanned comparison was made between the two pre -test..... The results (See Appendix A) present the scores as.....
Not significant.....
The results showed.....
The results support the prediction that.....
Analysis of variance showed.....

**DISCUSSION**

Follows on from the “Results” section with the title “Discussion” aligned to the left.

The main idea of the discussion section is to examine, interpret and qualify your own results with previousresearch. Andtodrawinferencesfromtheresults.

Open the discussion with a clear statement of the support or non-support for your hypothesis (i.e. relate the results you have obtained back to your hypothesis – what you expected).

Examine and relate similarities and differences to previous research, mentioned in the introduction and other sources.

BRIEF outline of the shortcomings of the experiment – and the ways to overcome them. Identify the practical and theoretical implications of your study.

**ASK YOURSELF**

What do your results indicate for the real world, and is further research needed? What did the experiment investigate?
What did the experiment find?
What did the results show?

Then relate the results back to previous research!
Generalise (what do your results indicate for the ‘real world’).
Briefly look at some of the methodological difficulties and limitations. Examine suggestions for further research.
Ask: what could you put for a concluding statement?

**HELPFUL STARTING SENTENCES**

From the results.....
The figures indicate.....
This study indicates that.....
The findings appear to support the views of.....
This finding is consistent with.....
Taken together, the results.....
Analysis of the data indicated the results support the prediction that..... This explanation seems unlikely.....
The rationale was that.....
However, analysis of the data.....
Many research studies have examined.....
The significant difference between .... Showed (suggests that) (revealed)..... It also supports.....
This suggests that.....

This study also found.....
Based on our analysis.....
This is consistent.....
It also supports the findings of..... The effectiveness of.....

Despite the success of this experiment..... Future research on the effects of.....
The results of the present study indicate.....

**REFERENCES**

Start on a new page with the word “References” aligned to the left.
Only put references you have cited in the text, not all of those you have read to write the report.

Follow the approved SES referencing format found in the document titled “Reference Guide”. No other format will be accepted.

**APPENDIX**

Start on a new page with the word “Appendix” aligned to the left.
Can be mentioned anywhere after the introduction.
Includes raw data, instructions if too long to be included in the methods section. Each Appendix must have an identifying letter and title, i.e. Appendix A Raw Scores. The plural of Appendix is Appendices (e.g. see Appendices A and B).

**WORD COUNT**

Graphs/tables in the results, reference list and appendix sections are not counted.

Remember to indicate word count somewhere in the document and a range +/ -10% of designated word count is acceptable.

10

**POINTS FOR WRITING STYLE**

**USE THE ACTIVE VOICE**

*POOR:* The experiment was designed by Gould (1970).... *BETTER:* Gould (1970) designed the experiment.....

**USE PAST TENSE**

Generallythepasttenseisusedthroughoutthepaperexceptinthediscussionandwhentalkingabout results, then it’s present tense.

**AVOID AMBIGUITY**

*POOR:* This study examined.....
*BETTER:* This present study examined....or.... This study by Smith (1945)...... i.e., be specific when

referring to ‘this’ study: Which study are you referring to?

**NON-SEXIST**

Don’t use ‘he’, or man, unless referring to a male.

**ETHNIC BIAS**

Be aware of making comparisons to your own culture.

**DISABILITY BIAS OR LABELLING**

Remember to put the *person* before the disability. *POOR:* He’s schizophrenic.....
*BETTER:* The man with schizophrenia.....
*POOR:* He’s cerebral palsied.....

*BETTER:* The boy with cerebral palsy.....

**WHEN WRITING DON’T GIVE THE EXPERIMENT THE STATUS OF A PERSON**

*POOR:* This experiment will demonstrate.....
It is the experimenter who does the demonstrating, not the experiment. *BETTER:* The purpose of this experiment is to demonstrate.....

**ECONOMY OF EXPRESSION**

**WORDY**

Based on the fact that
At the present time
For the purpose of this experiment
There were several subjects who completed

**SUCCINCT**

Because
Now
For this experiment Several subjects completed

**THE *ITALICIZED* WORDS ARE REDUNDANT AND SHOULD BE OMITTED** They were *both* alike
*A total of* 37 subjects
Four *different* groups saw

Instructions, which were *exactly* the same as those used *Absolutely* essential
Has been *previously* found
Small *in size*

*One and* the same
In *close* proximity *Completely* unanimous *Just* exactly
*Very* close to significance *Period of* time Summarize *briefly*The reason is *because*

**OTHER POINTS TO REMEMBER (and common mistakes students make)**

Be crisp and concise

Watch spelling

Check grammar: i.e., possessive apostrophes (e.g., the subjects’ notes).

Double space all work.

Paragraphs must be longer than one sentence.

In the title mention the variables; the independent and dependent.

Introduction; use important research and finish with the hypothesis.

Write out the equipment used as prose, don’t list them. Outline what the equipment used was used for.

Write out the results as prose.
Watch which tense you are writing in.
Start sentences with words/letters not numbers.
Only use ampersand in brackets i.e., (Smith & Jones).
The abstract is a brief overview, not step by step.
Graphs should be about a quarter to half a page and referred to as Figure 1 (or 2, 3 etc).

**FEATURES**

In addition to the special convention for laboratory reports, they should also display the following features;

**EVIDENCE OF READING RELEVANT LITERATURE**

References, appropriate to research, supporting your argument at the present paper. Each issue you present in your experiment need to be referenced correctly.

**INTEGRATION AND BALANCE**

Integration and balance, refer to being able to pull together theoretical and practical issues (i.e., from theory and previous research) as in the point above, to make it sound plausible as to why you’re doing this study.

You may also consider research which opposes the view you hope to support.

**ANALYSIS AND CRITICAL THINKING**

Similarly to the point above, you need to analyse various parts of research and/or theory to (for example); 1. Take out relevant facts/issues to your area of interest. 2. Determine methodological problems with this research. 3. Logically apply previous research/theory to your study.

**CORRECT ENGLISH APPLICATION**

Self explanatory, e.g., sentence construction, grammar, etc.

**GOOD PRESENTATION**

Neat, double spaced, dark print, etc.

**ACCURATE AND COMPLETE REFERENCING**

Evidence of following the approved SES reference format.

**EDITING AND PROOFING**

Spelling mistakes, punctuation, full stops, possessive apostrophes, etc.

**LENGTH LIMITS**

Adhere to the correct word limits for each assessment.