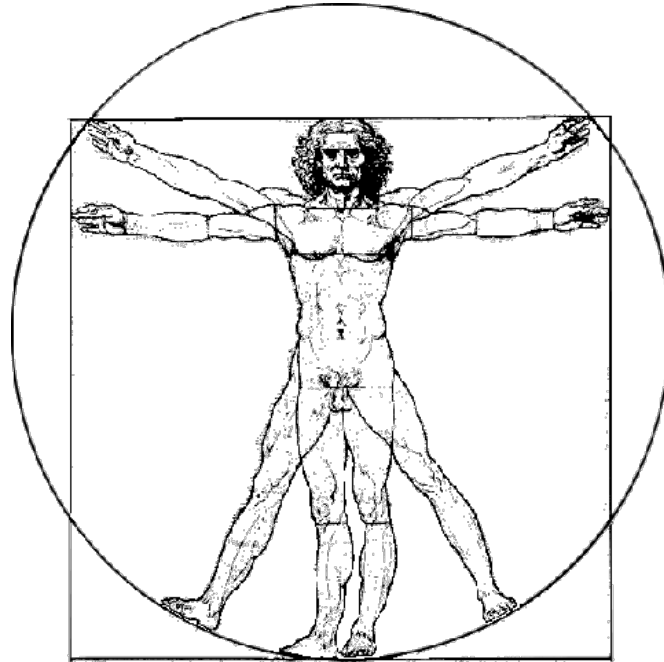


# DEPARTMENT OF HUMAN KINETICS AND ERGONOMICS



## HKE Handbook 2021 Postgraduate Students

*General Information*  
*Timetables*  
*Course Outlines*  
*Examination Information*



**RHODES UNIVERSITY**  
*Where leaders learn*

This handbook contains all relevant organisational information for HKE postgraduate students for 2021. Please study it carefully at the beginning and throughout the academic year. Follow the instructions; no excuse will be accepted for ignorance when rules are violated.

Dates and locations are subject to change. Please check the departmental notice board for updated information.

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Makhanda / Grahamstown, February 2021

Department of Human Kinetics and Ergonomics

Rhodes University

## 1 Departmental Information

This section contains various departmental information. For further information, please regularly consult the departmental notice boards or the departmental website: <http://www.ru.ac.za/humankineticsandergonomics>.

### 1.1 Location

The Department with all its lecture rooms, laboratories and offices is located in the Human Kinetics and Ergonomics (HKE) building in upper African Street (between Croft Street and Warren Street; before the Sports Administration Building and next to the Rhodes Health Suite; on the University map in Rhodes calendar buildings G2 and G3).

### 1.2 Departmental Staff

#### Departmental Staff

	<u>phone</u>	<u>email</u>
Mrs J McDougall (Office Administrator)	046-603 8471	<a href="mailto:j.mcdougall@ru.ac.za">j.mcdougall@ru.ac.za</a>
Prof C Christie (Associate Professor)	046-603 8470	<a href="mailto:c.christie@ru.ac.za">c.christie@ru.ac.za</a>
Dr S Zschernack (Senior Lecturer & Head of Department)	046-603 8472	<a href="mailto:s.zschernack@ru.ac.za">s.zschernack@ru.ac.za</a>
Mr A Todd (Senior Lecturer)	046-603 8469	<a href="mailto:a.todd@ru.ac.za">a.todd@ru.ac.za</a>
Mrs M Mattison (Lecturer)	046-603 8468	<a href="mailto:m.mattison@ru.ac.za">m.mattison@ru.ac.za</a>
Dr J Davy (Lecturer)	046-603 7369	<a href="mailto:j.davy@ru.ac.za">j.davy@ru.ac.za</a>
Dr L Pote (Post-Doctoral Fellow)	046-603 8471	<a href="mailto:l.pote86@gmail.com">l.pote86@gmail.com</a>
Mr L Goodenough (Principal Technical Officer)	046-603 7366	<a href="mailto:l.goodenough@ru.ac.za">l.goodenough@ru.ac.za</a>
Fax machine	046-603 8934	

Please feel free to contact the departmental staff members for any query you may have.

### 1.3 Access and Security

All postgraduate students are issued with a key to the side door of the HKE Department, allowing access to the Department at any time for studying purposes. A **R50 key deposit** is payable in cash to the office administrator upon receipt of the keys. This will be refunded when the keys are returned upon completion of the degree. Students are also provided with the alarm code and all staff and students are required to sign in and out on the whiteboard hanging up next to the alarm keypad!

For security reasons the keys to the glass doors in the foyer will only be accessible to staff and the doors will be locked outside of working hours (before 08:00am and after 04:30pm), during lunch (12:45pm to 2:00pm), as well as during the examination and holiday periods.

To discourage criminals from entering the HKE Department, it is each individual's responsibility to ensure that the security of the Department is not compromised by:

- Ensuring the side door is always closed and locked after entering and exiting (DO NOT leave the door ajar when, for example, waiting for research participants to arrive).
- Ensuring that the last person leaving the Department activates the alarm code.
- Being vigilant of strangers entering and exiting the Department.
- Escorting strangers to their point of interest in the Department (e.g. the person they were looking for), as well as show them the way out.
- Reporting any suspicious people in the Department to the Office Administrator or academic staff.
- Keeping your personal possessions securely locked away in the lockers provided if you are not physically at your workspace. You will need to provide your own padlock.

Any violation of the access privileges may result in disciplinary action. Any lost keys will be charged at R50 per key. Cutting or replacement keys has to be done via the Office Administrator - **DO NOT** have them copied in town!

#### 1.4 Room Allocation / Workstations

The HKE Department attempts to create an atmosphere that is conducive to study and research activities. Postgraduate students are therefore provided with workstations in the Department.

The available offices are assigned according to the following rule: students will have the choice in the order of employee status and academic seniority:

1. Teaching / HoD assistants
2. PhD students

Masters and Honours students make use of flexible workspaces.

Exemptions from this rule require valid reasons acknowledged by the HoD.

#### 1.5 Library

All printed periodicals can be found in the Main Rhodes Library on central campus. Past MSc & PhD theses can be accessed online via the Rhodes University OPAC system: <https://www.ru.ac.za/library/search/> (click on "Theses and Dissertations").

Many past Honours projects can also be obtained in electronic format from the Department's Office Administrator. The same holds for older projects that are not in electronic format.

## 2 General Considerations

### 2.1 Plagiarism

Plagiarism is a serious offence, and Rhodes University has a Plagiarism Policy, which details the procedures relating to plagiarism at a postgraduate level, as well as further information relating to plagiarism. Students are encouraged to familiarize themselves with the latest version of the Rhodes University Plagiarism Policy, which can be accessed on: <https://www.ru.ac.za/media/rhodesuniversity/content/institutionalplanning/documents/Plagiarism.pdf>. The staff member in charge of dealing with plagiarism cases for 2021 is Dr. Zschernack.

#### **What is Plagiarism?**

Plagiarism refers to the practice of presenting work / material written by someone else as your own, and is thus unethical. Any use of material that is derived from the work of another person constitutes plagiarism unless the source is clearly acknowledged in the manner described below. You will be guilty of plagiarism if, for example, you hand in an assignment under your own name which, either in part or as a whole:

- is copied from an essay or practical report written by another student,
- is copied from a document downloaded from a website,
- is copied from a published article or book chapter, or
- has been written for you by someone else.

#### **How to avoid plagiarism**

Acknowledge the source of the material! When writing an essay or laboratory report in an academic setting it is normal to draw on material written by other people. However, when you do this, it is important that you acknowledge the fact that you have drawn on other people's work. There are standard procedures for doing this - for example, by citing a reference and providing details of the source in a reference list at the end of the assignment. You are expected to do this even where you do not quote directly from your source, but merely express in your own words ideas, concepts, methodologies or arguments which you have taken from that source. Take note that the source of copied images (photographs, diagrams, graphs, etc.) also need to be acknowledged. In addition, where you quote verbatim from a published source, you must place the quoted material in inverted commas and provide a page number. The only situation in which these rules do not apply strictly is in examinations as these are generally written without access to books and other reference materials. Please refer to section 7 of this handbook (Format Guide) for details on how to reference in an HKE assignment / thesis.

#### **Disciplinary action in response to plagiarism**

As a University student it is important that you understand and observe the highest standards of ethics, integrity and professional practice in the writing of assignments, laboratory write-ups and research reports / theses.

The Department of Human Kinetics and Ergonomics therefore expects these high standards to be adhered to as a matter of course. Many students think that there is no harm in copying sentences from books and articles when composing any written work.

However, in terms of the policy stated above, the use of even one sentence without acknowledgement constitutes plagiarism and is not acceptable.

### **Senate policy on plagiarism**

The Senate of the University has adopted an overall policy towards the handling of plagiarism. In terms of this policy:

- Departments are encouraged to address the matter in their teaching, and to train students in the correct procedures for acknowledging the sources of material used for assignments.
- Cases of plagiarism must be addressed by disciplinary procedures within the Department or at University level.
- Disciplinary steps may range from giving a warning (for first time and minor offences), to imposing a mark penalty or, in more serious cases, to withdrawing the student's DP.

### **HKE Department policy**

In accordance with the University Plagiarism Policy there are three graded categories of plagiarism – categories A, B and C.

**Category A offences:** these “constitute first time, minor infringements, and are usually handled by the staff member who detects the offence. However, in circumstances where the assessor is a student tutor or demonstrator, it may be appropriate for the matter to be dealt with by the lecturer in charge of the course, or the course co-ordinator, to provide the necessary authority” (p.6).

As a general rule, the following actions are taken should a student be found guilty of plagiarism of a category A offence:

- First minor offence: 20% deduction of allocated mark, and student(s)' name(s) noted within department records.
- First major offence: a mark of zero and name sent to the University's Plagiarism Committee.
- Any second offence: withdrawal of the student's DP and name sent to the University's Plagiarism Committee.

**Category B offences:** these “relate to repeated offences of a minor nature, or to relatively minor offences at a more senior academic level than first year, or to first time, more serious offences, where the offence would not attract a penalty of more than the loss of a DP certificate. Where a member of staff is uncertain as to whether an alleged case of plagiarism constitutes a category A or B offence, this matter should be discussed with the Head of Department, and a decision should be taken that is consistent with previous practice in the Department. In large departments, Heads of Department may delegate this role to a senior member of staff. If a Category B offence is detected, the matter must be referred to the Head of Department or nominee, who must refer the matter to the Departmental Plagiarism Committee for a hearing” (p.6).

**Category C offences:** these “concern major, extremely serious infringements by students which the Departmental Plagiarism Committee deems worthy of adjudication by a Disciplinary Committee of the Senate Standing Committee on Plagiarism” (p11).



## 2.2 "Duly Performed" (DP) rule

Please note that the "Duly Performed" rule applies to all academic departments at Rhodes! It is particularly important that students understand that no department is obliged to warn students that their performance is not meeting the requirements of the DP regulations of the department.

Students must be responsible for monitoring their own performance. If a department refuses a DP certificate to a student and the student appeals for reconsideration (to the HOD in the first instance and then to the Dean), no consideration will be given to any claim that the student was unaware that performance was such that it did not meet those requirements. Students are responsible for determining whether they are satisfying the requirements of the department, by checking with the HOD in cases of doubt.

## 2.3 Attendance

Attendance at lectures is compulsory for Honours students and in the case of absence, an LOA must be submitted together with supporting documentation. For Honours students 60% of the final mark is based on the modules' class (30%) and examination marks (30%), hence attendance at lectures is invaluable. Please also be aware that it is each individual's responsibility to acquire the knowledge required to pass the exams!

Regarding attendance at research seminars, please refer to Section 2.6. It is also expected that all postgraduate students are present in the Department during the day outside of lecture times.

Please note also that postgraduate lectures, exams and holiday dates **DO NOT** correspond with the university's undergraduate term dates. Non-lecturing dates should **NOT** be considered holiday time, but be used for research purposes. It is expected that all postgraduate students negotiate their leave/vacation dates with their respective supervisors.

## 2.4 Activity Profiling

The HKE Department keeps a record of all the HKE-related activities that students choose to be involved in during their time in the Department. The purpose for keeping such a record is that it provides the HKE staff members with a detailed record of involvement that can be reflected on a reference letter, or can be used as motivation when applying for further postgraduate studies.

Such activities may involve being a class representative, tutoring, participating in consultancies, community engagement, or simply administrative assistance, just to name a few. Participation in research activities particularly is considered a huge educational experience, and all students are therefore strongly encouraged to participate in postgraduate (Honours, Masters or PhD) research projects. This can be in the form of a research participant, as an assistant to the main researcher in the laboratory, or for data capturing and reduction.

Please note that the onus is on each student to inform the HKE Office Administrator, Mrs McDougall, of the activities he/she has been involved in, as she will be keeping a record

of each student's involvement. The required information includes:

1. Student number
2. Student's full name
3. Year of participation
4. Research Participation:
  - a) Researcher's name
  - b) Research project involved in
  - c) Involvement (e.g. participant, assistant)
5. Teaching and Learning: e.g. Tutor, teaching assistant, lab assistant
6. Consultancy Projects:
  - a) Project (e.g. ergonomics consultancy, medico-legal assessments etc.)
  - b) Specifics of project (e.g. name of company/ patient, title of report, etc.)
  - c) Activity (e.g. report writing, assessment etc.)
7. Other Departmental Involvements – Activities (e.g. sorting theses, tidying labs etc.)

## 2.5 Tutoring and Research / Laboratory assistance

The HKE Department offers different positions for tutoring and research / laboratory assistance. This enables students to gain additional experience in teaching. Students are encouraged to apply for such positions as this experience contributed immensely to their personal growth and reflects well in CVs and reference letters.

Each position requires about 6 hours of tutoring / lab demonstration per week during term times (26 weeks per year). Students are remunerated according to Rhodes policy. All tutors and laboratory assistants will receive training.

Dr Jonathan Davy ([j.davy@ru.ac.za](mailto:j.davy@ru.ac.za); 046-603 7369) and Prof Candice Christie ([c.christie@ru.ac.za](mailto:c.christie@ru.ac.za); 046-603 8470) are the overall Tutorial & Practical coordinators for first and second semester respectively.

### Tutorial System

Tutorials refer to small formal discussion groups and are held weekly for first and second year students and are designed in such a way as to compliment the lectures by recapping work done in class; no new work is covered in the tutorials. The tutorials will help to consolidate knowledge by providing students with the chance to discuss any problems experienced with the course, particularly with regards to understanding the principles underlying observations and measurements, and developing observational, deductive and interpretive skills.

Each 1<sup>st</sup> and 2<sup>nd</sup> year student must attend one tutorial session each week of the term, on an allocated day of the week (this will fit into each student's timetable), unless the coordinator of the tutorials states otherwise. Tutors allocated to these years are expected to run these weekly tutorial sessions, as well as assist in the weekly practicals.

Tutors will receive appropriate training before tutorials commence. Throughout the year tutors will also meet with the respective lecturer and/or the Tutorial & Practical coordinator on pre-arranged days and times.

### Research / Laboratory Assistance

Only Masters and PhD students are eligible for appointment as research assistants and their duties include facilitation of honours laboratory and research work, as well as facilitating HKE 3 laboratory exercises and assessing lab reports.

## 2.6 Research Seminars

The purpose of research seminars is to engage in critical discussions with all academic staff and postgraduate students. The research seminars will consist of a variety of activities, including, but not limited to: debates, discussions of current issues in our discipline, exchange of information of research activities within the Department, feedback from conferences, guest speakers, as well as practical skills training in research methods, use of statistical software, advanced word processing etc. These seminars are compulsory for all postgraduate students, unless otherwise indicated.

All seminars will be held on **Thursdays from 11:00am to 12:30 noon**. Please consult the Research Seminar programme, which will be regularly updated and communicated to all staff and postgraduate students via e-mail. Cases of absence of a compulsory seminar require LOA submissions. The Research Seminar Coordinator for 2021 is Prof Candice Christie.

## 2.7 Student feedback and participation

Students are asked to participate actively to the Department by providing feedback and suggestions on how to improve and meet student needs. Any comments or requests are welcomed by the departmental staff at any time.

### Communication

In order to provide clear and confident communication between students and staff, the course coordinators and the class representatives are advised to meet once each term to exchange information and discuss upcoming problems. Both representatives shall discuss issues with her/his colleagues before and after this meeting to get a broader audience addressed.

Course coordinators:

HKE Honours: Prof Candice Christie

HKE Masters & PhD: Prof Candice Christie

### Performance monitoring

Staff endeavour to provide students with feedback about their performance in tests and assignments within two weeks of submission. A preliminary class record mark based on the assignments and tests completed is published by the department at the end of each term. Students are asked to make use of this opportunity to monitor their own performance regularly and request support early enough.

## 2.8 Ethical Approval of Research Projects

All research projects that involve humans as participants have to be approved by the Rhodes University Ethical Standards Committee (RUESC). For more information on the Ethical Standards for Research on Human and Animal Subjects, please visit: <https://www.ru.ac.za/researchgateway/ethics/>. The HKE ethics representative for 2021 is Mrs Miriam Mattison.

Before the commencement of a research project or pilot study, an application for ethical approval must be completed via the new online Ethical Review Application System

(ERAS). Explorative studies / pre-pilot studies (e.g. for familiarization with equipment) do not require ethical approval, but need to be performed with the supervisor's consent and use only senior HKE students as 'participants'. Ethical principles of beneficence, justice and respect have to be upheld during these explorative studies.

The ethics application has to be submitted online and be approved by the supervisor (and co-supervisor where applicable), since the supervisor is considered the principal researcher. Once submitted, the application is first checked by the HKE ethics representative, who may request some adjustments. Once the ethics representative has OK'd the application, it is forwarded to two ethics reviewers assigned by RUESC. The outcome of the review will be communicated to the principal researcher and student researchers in written form. This might be an approval, an approval with stipulations (e.g. obtaining gatekeeper permission), a request to rework the application, or a rejection of the application (with reasons provided). While the human ethics research committee of RUESC meets once a month to discuss applications, please note that certain times during the year place a high demand on reviewers and the review process may take longer. One review round may therefore take at least one month – please take this into consideration in your project planning.

In cases where gatekeeper permission is required, a letter of provisional ethical approval is provided, which needs to be submitted to the gatekeeper and a gatekeeper approval letter be obtained. It is imperative to send the gatekeeper permission letter to the RUESC ethics coordinator and receive a letter stating final ethical clearance. It is only upon receipt of final ethical clearance that recruitment and testing may begin. Finally, it is possible that certain changes occur to the protocol after ethical approval has been received. Any changes in the experimental protocol must be communicated to RUESC and be approved before testing begins. Minor changes to the protocol only require resubmission of the affected part of the application form, but in the case of major changes, a completely new application may be required. Completion of an ethics feedback report is also required for the end-of-year postgraduate report.

## 2.9 IT Infrastructure

### 2.9.1 Central Registration of Computers

Central registration of personal computers allows internet access and printer access. Private computers of students and staff members may be connected to the departmental network or Eduroam WiFi. This can be done by connecting a non-registered computer to the network and requesting any website with the used web-browser. The registration form will appear automatically. The Department's Principal Technical Officer, Mr Luke Goodenough, can assist with this.

### 2.9.2 Cloud Storage

It is strongly recommended that students make use of one or other cloud storage facility, particularly when it comes to storing project data and reports, e.g. Dropbox or Google Drive. The HKE Principal Technical Officer can assist in this matter.

### 2.9.3 Photocopying and printing services

**Photocopies** are 45c per copy (this may be subject to change). Please ask the Office Administrator for the postgraduate printing and photocopy book. Make your copies and then write down the number of copies made. The Office Administrator will sum up the amount due to the Department and inform the students of the cumulated amount at the end of each term. Payment can also be done in advance to the Office Administrator.

**Laser printing:** the Department has a laser printer dedicated for student printing. This machine is linked to each student's 'iPrint' account and the costs for printing are automatically deducted. When printing to any other departmental laser printer, the number of pages *must* be recorded in the Office Administrator's printing and photocopy book. The Office Administrator will sum up the amount due to the Department and inform the students of the cumulated amount at the end of each term (45c are charged per page printed – this too may be subject to change).

**Setting up iPrint:** Go to Ross - printing balance link - check balance. Left hand tab – install printer from *iPrinta*. Select HKE student and follow prompts. The Office Administrator and/or Principal Technical Officer can aid in connecting students' private computers to 'iPrint'.

**Connecting to HKE Printer with Apple** – follow the above steps. If a problem occurs when you try download the Printer Driver and it fails to login with your credentials.

- Uninstall the iPrint client
- Reset the printing system from the printing preferences in systems prefs on MAC. (right click to get option)
- Install the iPrint client again (on <http://iPrinta.ru.ac.za/ipp/pdisplay.htm>)
- Then try download the driver for HKE students on the same link as above.
- Credentials should work.

**Colour printing** can be done via the Office Administrator's DeskJet colour printer and is charged at R4.50 per page (subject to change). If you need colour printing, email your document to the office administrator, requesting colour printing.

**Scanning** can be performed using the photocopy machine. Please consult the Office Administrator to assist you.

## 2.10 Research Equipment and Laboratories

Apart from several desktops, the HKE Department has laptops for data acquisition and a variety of sophisticated as well as non-electronic research equipment. These are stored in the various laboratories of the department or in the technician's office.

**Some equipment is very expensive; hence UTMOST CARE is required during its use!** The Department reserves the right to charge students the cost of repairing or replacing equipment damaged, lost or stolen due to negligence. If you intend using one of the electronic equipment, please consult the allocated "expert" for assistance (see Table I below).

**All equipment and laboratory space must be booked via the technical officer and office administrator. Please note that lectures and practicals have first option on the**

**use of equipment and laboratory space.** When in doubt, please consult timetables and/or the relevant lecturers or laboratory coordinators. Equipment removed from their respective rooms / laboratories **must** be signed out. After use the equipment **must be returned (cleaned and neatly packed into its bag / case / box) and signed back in.** During data collection a key for the relevant laboratory/room used can be signed out from the Office Administrator for the duration of your testing.

**Table I:** Electronic equipment available in the HKE Department

<b>Equipment</b>	<b>Expert</b>
Cortex Metabolic System	Christie/Goodenough
Piezo Pedometers	Christie
Polar heart rate watches and belts	All
Dikablis Eye Tracker	Zschernack
Audiometer and luminance meter	Zschernack
Force Platform	Zschernack
Neurocon Balance Master – specialized rehab force platform	Todd
Biodex – isokinetic dynamometer	Todd / Mattison
Lumbar Motion Monitor	Todd / Mattison
Megawin EMG	Zschernack
TechnoGym Treadmill	Todd/Christie
Concept 2 Rowing Ergometers	Todd/Christie
Wattbike	Todd/Christie
Chatillon Dynamometers	Todd
Biometrics Data Logger	Zschernack/Mattison
Thermographic camera	Davy/Christie
Actiwatches	Davy
Bioharnesses with GPS	Goodenough
Qualisys Motion Analysis System	Goodenough/Todd

## 3 Honours Course in HKE

Course coordinator: C Christie (email: [c.christie@ru.ac.za](mailto:c.christie@ru.ac.za), phone: 046-603 8470)

### 3.1 Admission

Minimum requirement for admission is a Bachelor Degree in Human Kinetics and Ergonomics or any other Bachelor course providing the required basic knowledge. Final admission will be based on merit, depending on number of applicants, staffing and laboratory equipment resources. In past years, applicants with marks of at least 60% to 65% in HKE 3 were accepted. It must be noted however, that second year marks are also referred to, as well as involvement in HKE-related activities, such as participation in research, community engagement and/or consultancies. Staff capacity and senior postgraduate supervision load are other important considerations.

### 3.2 Expectations of an Honours Student

Pursuing postgraduate studies requires developing certain skills and competencies that offset a postgraduate student from an undergraduate student. In accordance with the South African National Qualifications Framework, the HKE Department expects an Honours student (NQF Level 8) to develop the following learning outcomes (*adapted from the South African Qualifications Authority – Level Descriptors for the South African National Qualifications Framework; November 2012*).

The student should be able to:

- Demonstrate knowledge and engagement in an area in the forefront of the discipline, understand the theories, research methodologies, methods and techniques relevant in the field and understand how to apply such knowledge in a particular context
- Interrogate multiple sources of knowledge and evaluate them (knowledge literacy)
- Select, apply and transfer appropriate standard procedures, processes or techniques to unfamiliar problems
- Demonstrate the ability to use a range of specialized skills to identify, analyse and address complex or abstract problems (problem-solving)
- Identify and address ethical issues
- Access, process and manage information
- Present and communicate academic professional and occupational ideas and information
- Demonstrate the ability to operate effectively within a system
- Apply, in a self-critical manner, learning strategies which address his/her professional and on-going learning needs (life-long learning)
- Demonstrate the ability to take full responsibility for his / her own work, decision-making and use of resources (self-responsibility).

In addition to the above, it is important to note that the DP rule still applies for Honours students. Any absence from compulsory activities (i.e. lectures, practicals, assignment deadlines etc.) require a formal Leave-of-Absence (LOA) application. This form can be obtained from the office administrator. Foreseeable absences (e.g. sports tournament)

must be applied for **IN ADVANCE**, while LOA applications due to unforeseeable circumstances (e.g. illness) must be handed to the office administrator as soon as possible upon return to the department.

### 3.3 Structure of the HKE Honours Degree

***Kindly note that although the HKE Department takes care in the development and publication of the details of the Honours course, these may be subject to change, particularly in the Covid-19 context. Any changes that may be necessary will be communicated to students.***

The HKE Honours course consists of 5 compulsory seminar modules, as well as a service-learning module and a research project.

#### 3.3.1 Seminar Modules

Seminar modules provide students with knowledge background. These half-day seminars contain lectures, interactive work and laboratory practicals. The modules are taught throughout the year and are compulsory. Although lecture times may vary slightly from one lecturer to another, the times allocated to lectures are generally Mondays – Fridays from 8:30 – 13:00. Please consult Table II for the various modules on offer and their dates. It is however expected that students are **in attendance** (i.e. physically present in the Department as the Covid-19 context allows) for the **full day**. The afternoons should be dedicated to assignments and project work.

In addition to the seminar modules in Table II, students will also participate in a Service Learning module, which will entail gaining practical work experience in various community projects the HKE Department has partnered with. While there is no formal examination associated with this particular module, quality of involvement in these projects and a portfolio submission based on the service-learning component, will form part of the Honours class mark.

Compulsory HKE Honours orientation sessions will be held the week of **1 March 2021**. Seminars will commence the following week (**8 March 2021**) and will be held virtually first until such a time that face-to-face contact is permitted again. Face-to-face classes will be held at the HKE Department in Rm 26 from Mondays to Fridays on the dates shown in Table II. Please check the HKE Honours board for details.

**Table II:** Lecture Outline for HKE Honours modules

Term	Module	Lecturer	Dates
1	Research Methods	S Zschernack	Mon 8 Mar – Fri 26 Mar + 10 lectures ad hoc throughout the year
	Physiology	C Christie	Tue 29 Mar – Fri 23 April
2	Systems	J Davy & A Todd	Mon 3 May – Tue 25 May
	Ergonomics Assessment	M Mattison	Wed 26 May – Thu 27 May



<i>Physiology: Monday 28 June 2021</i>			
<i>Examinations: Systems: Friday 2 July 2021</i>			
<i>Ergonomics Assessment: Monday 5 July 2021</i>			
3	Biomechanics & Accident investigation (cont.)	A Todd & S Ngcamu-Tukulula	Mon 26 July – Fri 13 Aug
4	Science Communication	S Zschernack	Mon 25 Oct – Wed 27 Oct (3 lectures)
<i>Examinations: Biomechanics &amp; Accident Investigation: Monday 06 September 2021</i>			
<i>Research Methods: Monday 01 November 2021</i>			

Finally, it should also be noted at this point that even though no lectures are scheduled during the Rhodes vacations, it is expected that students dedicate this time to the research projects and may be expected to remain in Grahamstown. Each student's project supervisor has to be consulted and informed about leave times.

### 3.3.2 Service-learning Module

All honours students are also required to participate in a service-learning module. This module focuses on the application of undergraduate and postgraduate knowledge within a community setting. The purpose of this module is to provide students with opportunities to apply their theoretical knowledge within a practical setting, while simultaneously providing a service to the broader community. The type of work/experience will vary from year to year depending on the current community-based projects that the department is involved in. Over the course of the year, students will be responsible for developing a portfolio of evidence on the work that they have conducted, which will form part of the class mark. The outcome of the module is consistent with those of typical service-learning courses, and the portfolio of evidence should demonstrate the following three objectives:

- 1) contributing to local human and community development;
- 2) improving the quality of academic learning within the discipline; and
- 3) improving the leadership/civic/character development of students.

### 3.3.3 Further Training Seminars

All Honours students are expected to attend the seminars offered by the Rhodes University Centre for Postgraduate Studies. Further, in-house seminars offered by the HKE Department focussing on practical skills training such as the use of statistical methods, statistical software, advanced Word and Excel skills, reference managers, ethics etc. may be scheduled from time to time and will be communicated to students.

### 3.3.4 Research Project

The objective of the research project is to introduce students to empirical research through the investigation of a kinesiology or ergonomics study. Emphasis is on the conceptual development and the scientific rigour students apply during the course of this project. Throughout the year, students will be assessed on various 'steps' of the projects, the final

product`, as well on the process by their supervisor, i.e. how they conducted themselves during the course of the project's duration.

The length of the report should be in the format of an extended manuscript / journal article, following the format of the Journal of the Ergonomics Society of South Africa, and be restricted to 25 pages, excluding references and appendices. For a detailed break-down of how to structure a long empirical report, refer to the Basic Format Guide on p.29.

### **Topics**

The research projects will start at the beginning of the first term with a variety of topics being presented and discussed during the Honours Orientation Day on **Monday 1 March 2021**. These topics generally fall in line with research interests of the academic staff. Students will be required to submit three choices of topics after which the academic staff will allocate research projects and supervisors to students. Efforts will be made to grant each student his / her primary choice, while also taking teaching, research and supervision loads of academic staff into account.

### **Interim Presentation and Submission**

During the week of **7 June 2021**, Honours students will present their project progress (background, problem statement and hypotheses) during an extended research seminar. The presentation will be assessed by the supervisor and an "advisor" assigned to each project from the HKE staff cohort. The mark will be based on the quality of the presentation as well as how the student engages with the comments.

The first three sections / "chapters" of the research projects (introduction, review of literature and methodology) have to be submitted on **Friday 18 June 2021, by 4 p.m.** via email to: [j.mcdougall@ru.ac.za](mailto:j.mcdougall@ru.ac.za).

### **Ethics Application**

Shortly after the May presentation, but prior to a project's pilot studies and data collection, students are required to submit an Ethics Application to the Rhodes University Ethical Standards Committee (RUESC) for approval. The link to the online form to be completed as well as more information about RUESC can be found on: <https://www.ru.ac.za/researchgateway/ethics/applyforresearchethicsreview/>. Once submitted and signed by the student researcher and his/her supervisor(s), the application is validated by the HKE Ethics Representative before being submitted for review. Please refer to section 2.8 for more details on research ethics and its application process, or ask the HKE Ethics Coordinator. Processing takes **at least one month** and often requires adjustments, or even resubmission. It can therefore take up to a month for final ethical approval to be granted, so take this into consideration for your project's time management.

### **Data Collection**

During the data collection / experimentation phase students will be requested to book the required laboratory and equipment. This can be done via the Principal Technical Officer (for equipment) and Office Administrator (for laboratory keys). Please refer to section 2.10 in this handbook. Keys and equipment need to be signed out and returned in the same **clean and neat state** as they were received soon as possible after testing

has been completed.

Intended use of laboratory space have to be reported to the Principal Technical Officer and Office Administrator. This is necessary as undergraduate practicals, Honours projects, and sometimes Masters' research, run concurrently and may need to use the same equipment and / or laboratory space. Due to the limited availability of equipment, it may also be required of students to perform their testing during the Rhodes vacation or after hours (evenings or week-ends). Consideration of fellow students is required when booking equipment and labs - please only book a slot if you definitely will be testing then. Please also note that lectures and practicals have first option. Consult the timetable and relevant lecturers in this regard.

Data collection should be completed during the third term to allow for sufficient time for data analysis and interpretation.

### **Project & Poster Hand-in**

The deadline for the research report is **Monday 26 November 2021** by **4:00pm**. Students should each submit their project in electronic format (MSWord and PDF) to the HKE Office Administrator ([j.mcdougall@ru.ac.za](mailto:j.mcdougall@ru.ac.za)). The following should be submitted with the final project report:

- Final ethics documents (e.g. final ethics approval, feedback to participants, signed participant consent forms)
- Photographs of data collection
- ALL raw data (paper and electronic)
- Statistica files

The date on the project should be the year of study (NOT the year of graduation as for Masters and PhD theses). The project report will be marked by the supervisor and "advisor" from the HKE staff cohort, while the only supervisor will provide a "process mark".

In addition to the research report, students will prepare a poster based on their projects. The Microsoft Publisher template for the poster can be obtained from the Office Administrator.

The deadline for the poster submission is **Monday 26 November 2021** by **4:00pm** to the office administrator ([j.mcdougall@ru.ac.za](mailto:j.mcdougall@ru.ac.za)).

### **Assessment Criteria**

Assessment of the research project is based on a number of criteria and 'milestones' reached during the project process. These include marks allocated for the interim presentation and initial submission of the first three sections / "chapters", the final report and poster presentation, as well as the student's conduct during the research process.

Process criteria include: self-responsibility of the student, original contributions from the student, rigour in data collection and processing, amount of supervisor feedback required, requirements for supervisor intervention, timing and resource allocation.

Assessment criteria for the project report include quality of: problem identification, methodological set-up, rigour in data collection, rigour in data analysis, interpretation of results/discussion, formal correctness and writing (spelling and grammar), poster. Table III provides a break-down of the components making up the research project mark.

### 3.3.5 Fieldtrips

If and when permitted in the Covid-19 context, fieldtrips are arranged by the relevant lecturers as part of their modules. Advanced notice of when and where these field trips will be taking place will be given to students closer to the time, as these are dependent on the relevant industry.

### 3.3.6 Contribution and support for other departmental activities

The HKE Department is also involved in various “expert services”, such as community engagement, high performance testing, ergonomics consultancies, training courses and office ergonomics, etc. Interested students are encouraged to become involved in these activities as they may arise. (Refer to section 2.4 on “Activity Profiling”).

## 3.4 Assignments and Examinations

The final Honours mark is a combination of marks from the seminar modules, the service-learning portfolio, as well as the research project. Honours seminar modules will be assessed using assignments set during class, as well as the examination at the end of either the first or second semester. Examinations will consist of either a written exam, a practical exam or a combination of the two. The service-learning component will form part of the Honours class mark. Each lecturer will announce the exact examination requirements for each module.

The final mark for the HKE Honours degree will consist of:

**Table III:** Mark composition for HKE Honours class.

	Contribution	
Class record	30%	All modules (including the service-learning module) carry equal weight (5% each) and consist of the class record and the service-learning component.
Examinations	30%	All modules (excluding service-learning) carry equal weight towards the exam mark (6% each).
Research Project	40%	The project mark itself consists of the following components: <ul style="list-style-type: none"> <li>• Interim presentation</li> <li>• First submission of introduction, literature review and method</li> <li>• Final submission of full report</li> <li>• Poster</li> <li>• Process mark</li> </ul>
<b>Final mark</b>	<b>100%</b>	

### 3.5 Course content

#### **Honours seminar module 'Research methods' (S. Zschoernack)**

This module focusses on the question of how to set up and carry out research of human responses. Such knowledge is not only important for research, but equally for the application of human factors in light of the complexity of human responses in real environments. This module highlights the basic theories of scientific research and their implications on the way we study the Human Factor. It builds a link between the practical question and the set-up of appropriate analysis and evaluation, starting from relatively immediate responses to more complex effects, such as cumulative effects on health, coping effects with overload and fatigue, studying human reliability etc. This is complemented by an extended view on human factors analysis methods that are necessary to ascertain human responses in vivo. Furthermore, this module includes practical considerations of carrying out basic and applied research as well as intervention programs.

#### **Honours seminar module 'Advanced Physiology' (C. Christie)**

One part of the Advanced Physiology module focusses on physical activity and health in all populations and sectors. The other part of the module looks at sports science including high performance sport, enhancing performance, and strength and conditioning.

#### **Honours seminar module 'Biomechanics and Accident Investigation' (A. Todd & S. Ngcamu-Tukulula)**

This course follows up and builds on the systems module that was presented in the first module. The purpose of the module is twofold; firstly to introduce students to the basics of the Human Factors and Ergonomics methods and tools for conducting accident investigations. This component of the course will include exposing students to real-world examples of accidents and the application of the aforementioned tools to these accidents. However, the module will go further by also investigating the potential contribution of biomechanics to accident investigation. This will be done to illustrate to students the importance of integrating knowledge from different domains to provide a holistic, integrated understanding of interactions between humans and other elements of the system that may lead to incidents and accidents. The focus of the biomechanics section will be on the potential impact of lower back pain. It will also offer plenty of opportunities for applied learning for the students through worked examples (e.g. how through investigating musculoskeletal injuries we can unearth the contribution of various factors related to process flow design, procurement of equipment, recruitment, medical surveillance and return to work management/ reintegration into the working environment, shift scheduling etc.). The outcome of the module will not only be an understanding of accident investigation methodologies but also how to map potential contributing factors such as musculoskeletal problems at the lower back.

#### **Honours seminar module 'Ergonomics Assessment' (M. Mattison)**

This module focuses on the practical execution of performing work analyses and ergonomics assessments in a variety of workplaces. Although the main focus is on micro-ergonomic assessment of risk for musculoskeletal disorders, some physiological, cognitive

and environmental methods are also introduced. In addition, theoretical considerations of developing and implementing an ergonomics programme, legal considerations and professional conduct are covered. Emphasis is laid on practical competence, and fieldtrips and fieldwork (as far as is permitted within Covid regulations) form an integral part of this module.

### **3.6 Further study options at HKE**

Refer to section 4.1 regarding admission to further postgraduate studies at the HKE Department.

## 4 Masters and PhD in HKE

Postgrad coordinator: C Christie (email: [c.christie@ru.ac.za](mailto:c.christie@ru.ac.za), phone: 046-603 8470)

### 4.1 Admission

#### 4.1.1 Admission for Masters Studies

The normal requirement for admission to a Master's degree at Rhodes is a four-year qualification of an acceptably high standard, i.e. usually a three-year Bachelor's degree, plus a good Honours degree in a relevant subject (taken from the Rhodes University official calendar). Minimum requirement for admission is a Bachelor Degree with Honours in Human Kinetics and Ergonomics or any other course providing the required basic knowledge.

Final admission is specific to the Department and is based on the following criteria (where applicable):

- Availability and willingness of a staff member to supervise the student and/or research project (it is recommended that interested students approach HKE staff and discuss areas of interest).
- Honours module marks (minimum Honours mark between 65-70%)
- Honours research project mark (process and content)
- Letter of recommendation from Honours research supervisor
- Demonstration of interest and reliability in the HKE Department and field of study, via tutoring, participation and/or assistance in research projects, conduct during research seminars etc. (refer to "activity profiling" in section 2.4). A good track record is important.
- A letter of motivation from the students on the work they intend to conduct, and reasons for pursuing a Masters degree.
- An academic writing sample (for external applicants)
- Staff consensus and/or discretion of the proposed supervisor.

#### 4.1.2 Admission for PhD Studies

In practice, most PhD candidates have a Master's degree. However, Senate may, on the recommendation of the Faculty concerned, convert the registration of a candidate for the Master's degree to registration for a PhD degree. Such conversions require the Head of Department and supervisor to be satisfied that the student's completed work is of a standard normally expected of a doctoral student, that the student is capable of completing a doctoral degree and that the project is of a level and scope expected of a PhD study.

For further information on the University's policy of Masters and PhD admissions, please visit the Rhodes University Postgraduate Gateway at: <https://www.ru.ac.za/postgraduategateway/>.

**PLEASE NOTE FOR BOTH MASTERS AND PHD APPLICATIONS:**

Completion of an Honours or Master's degree does **NOT** automatically guarantee acceptance for a Masters or PhD respectively. It is recommended that approach members of staff to determine their research interests and supervision capacity. Final admission is however dependent on staff consensus and is based on the criteria listed under section 4.1.1 (or selected relevant ones for PhD applications).

The application deadline for further postgraduate studies is only around April, but it is strongly recommended that you apply early in order to ensure that Departmental and staff capacities are not allocated elsewhere.

In addition, the application form for Masters and PhD requires identifying a supervisor and defining a topic (normally a brief project outline is required). If you consider a change in topic from your Honours or Masters research, you may provide a provisional topic and supervisor (with their knowledge). A precise research topic must then be refined and be made available at the end of the first term (2<sup>nd</sup> term at the very latest). This new / refined proposal will most likely have to be submitted to the Faculty for approval.

**4.2 Expectation from Masters and PhD students**

It cannot be emphasized enough that Masters or PhD studies should be regarded as **full-time work** (i.e. Mondays – Fridays from 8:00-5:00) for the full year. Vacations and time off should be discussed with the supervisor well in advance.

In accordance with the South African National Qualifications Framework, the HKE Department expects an MSc and PhD students (NQF Levels 9 & 10) to develop the following learning outcomes (*adapted from the South African Qualifications Authority – Level Descriptors for the South African National Qualifications Framework; November 2012*).

The anticipated outcomes as a Masters student are the following

- Demonstrating specialist knowledge to enable engagement with and critique of current research or practices, as well as advanced scholarship or research in a particular field (critical thinking).
- Being able to evaluate current processes of knowledge production and choose and appropriate process of enquiry for the area of study (critical thinking).
- Being able to design, select and apply appropriate methods, techniques, processes or technologies to complex practical and theoretical problems (mastering the scientific practice & time management).
- Using a wide range of specialized skills in identifying, conceptualizing, designing and implementing methods of enquiry to address complex and challenging problems and to understand the consequences of any solutions generated within an specialized context (problem-solving)
- Demonstrating the ability to make autonomous ethical decisions
- Accessing, processing and managing information
- Producing and communicating information by using academic and professional resources and defend substantial ideas that are the product of research (e.g. through journal submission, presentation at conferences or workshops).
- Being able to make interventions at an appropriate level within a system, based on



an understanding of hierarchical relations within the system, and the ability to address intended and unintended consequences of interventions.

- Developing his/her own learning strategies which sustain independent learning and academic or professional development (self-reflection & life-long learning), and can interact effectively within the learning or professional group as a means of enhancing learning (ability to transfer knowledge to others)
- Being able to take full responsibility for his/her own work (accountability, independence & self-responsibility)

The anticipated outcomes as a PhD student are the following:

- Demonstrate expertise and critical knowledge in an area at the forefront of a field or discipline and the ability to conceptualize new research initiatives and create new knowledge or practice (being a self-responsible researcher).
- Contribute to scholarly debates around theories of knowledge and processes of knowledge production, i.e. be able to challenge paradigms and theories.
- Be able to develop new methods, techniques, processes, systems or technologies in original, creative and innovative ways
- Apply specialist knowledge and theory in critically reflexive, creative and novel ways to address complex and theoretical problems (problem-solving).
- Identify, address and manage emerging ethical issues and to advance processes of ethical decision-making.
- Make independent judgments about managing incomplete or inconsistent information or data in an iterative process of analysis, synthesis.
- Produce substantial, independent, in-depth and publishable work which meets international standards, is considered to be new or innovative by peers, and makes a significant contribution to the discipline. Be able to develop a communication strategy to disseminate and defend research, strategic and policy initiative and their implementation to specialist and non-specialist audiences (e.g. through tutoring/lecturing, publication of journal articles, presentation at conferences and workshops, consultancy work).
- Understand the theoretical underpinnings in the management of complex systems to achieve systemic change, and the ability to independently design, sustain and manage change within a system.
- Demonstrate intellectual independence, research leadership and management of research and research development.
- Take full responsibility for his/her own work and lead, oversee and be held accountable for the overall governance of processes and systems.

## 4.3 Departmental Activities

### 4.3.1 Senior Postgraduate Orientation Seminars

An MSc / PhD orientation seminar series will be held during the morning of **Thursday 04 and Friday 05 February 2021**. The seminars' purpose is to discuss, with students and staff, each other's expectations of postgraduate conduct and work in the HKE Department, as well as some practical hints and tips about how to plan for postgraduate studies.

### 4.3.2 Participation in Honours Modules

Although Master's and PhD studies do not have a coursework component, postgraduate students are welcome to participate in Honours modules of their interest. Once they have indicated their interest in partaking in selected modules, Master's and PhD students must commit to the same DP rules and regulations as the Honours students and complete all assignments and exams for that/those module(s). Candidates who pass the module requirements will receive an accreditation for that/those module(s).

### 4.3.3 Fieldtrips

If and when permitted in the Covid-19 context, fieldtrips are arranged by the relevant lecturers as part of the Honours modules. Advanced notice of when and where these field trips will be taking place will be given to students closer to the time, as these are dependent on the relevant industry. Master's and PhD students are welcome to join these fieldtrips, provided the logistics allow it.

### 4.3.1 Further Training Seminars

All senior postgraduate students are strongly encouraged to attend the seminars offered by the Rhodes University Centre for Postgraduate Studies. Furthermore, in-house seminars offered by the HKE Department focussing on practical skills training such as the use of statistical methods, statistical software, advanced Word and Excel skills, reference managers, ethics etc. may be scheduled from time to time and will be communicated to students.

### 4.3.2 Contribution and support for other departmental activities

The HKE Department is also involved in various "expert services", such as community engagement, high performance testing, ergonomics consultancies, training courses and office ergonomics. Interested students are welcome to become involved in these activities.

## 4.4 Degree structure

The Rhodes University **Higher Degrees Guide** provides detailed information regarding higher degrees studies, including, but not limited to: (re)registration, research proposals, supervision, submissions, examination processes, financial matters, resources, etc.

The Rhodes University Postgraduate Gateway can be found at: <https://www.ru.ac.za/postgraduategateway/>.

## 5 Publications

The University encourages the publication of work done for higher degrees (for both Master's and PhD with the supervisor as joint author, where appropriate). There is little point in doing non-classified research unless the findings of the research are communicated to other workers, athletes or researchers in the field for their information and assessment. Every attempt should thus be made to publish as much of the thesis material as possible.

Some theses may be suitable for publication in full as books. More often, papers will have to be prepared from suitably edited sections of the thesis. Where papers are submitted for publication in journals, every attempt should be made to have the papers published in recognized and accredited journals. These are journals which are recognized by the Government's Department of Education for subsidy purposes. They nearly always use peer review as the criterion for publication. A list of these journals may be obtained from the Research Office.

### 5.1 Publishing thesis content

It is accepted for postgraduate students to publish (parts of) their research during the time of their studies, i.e. before the examination process. These publications, if written with co-authors should however be reflected in the thesis' reference list.

### 5.2 Authorship

For submitting abstracts for international and local conferences and / or journals use the following as guidelines on authorship:

Firstly, if an abstract/paper is written by a student on his/her research (honours, MSc, PhD), then he/she is the first author. However, if someone else writes the abstract/paper then the person who writes the majority of the paper is first author, even if it is a student project (e.g. it could be the supervisor). If a student writes the abstract/paper on his/her research project, the supervisor should be a co-author as he/she has made a contribution to the research and/or the abstract/paper (this includes work such as conceptualization, methodological ideas, reviewing/editing, etc.). Then there may be other authors too if projects/papers are joined. In cases of doubt consult one of the academic staff.

All co-authors need to approve a paper before it is submitted.

## 6 Further book suggestions for HKE

	HKE I	HKE II	HKE III	Hons	MSc
American College of Sports Medicine (1995). <i>Guidelines for Exercise Testing and Exercise Prescription</i> (5th ed. or latest edition). Philadelphia: Lea & Febiger. (ISBN 0-8121-0524-9).			X	X	X
Bridger, R.S. (2008). <i>Introduction to Ergonomics</i> (3rd ed. or earlier). London: Taylor & Francis. (ISBN 978-0849373060).		X	X	X	X
Baumgartner & Jackson (2014). <i>Measurement for evaluation in physical education and exercise science</i> (7 <sup>th</sup> or earlier edition). Boston: McGraw-Hill. (ISBN 978-0321935168)	X	X	X	X	X
Currell, G., & Dowman, A. (2009). <i>Essential Mathematics and Statistics for Science</i> (2nd ed. latest edition). Chichester: Wiley-Blackwell. (ISBN 978-0470694480).	X	X	X	X	X
Haslegrave, C.M., Chaffin, D.B., & Delleman, N.J. (2004). <i>Working Postures and Movements: Tools for Evaluation and Engineering</i> . Boca Raton: CRC Press. (ISBN: 978-0415279086)		X	X	X	
Helander, M. (2006). <i>A Guide to Human Factors and Ergonomics</i> (2nd ed.). Boca Raton: CRC Press. (ISBN: 978-0415282482)		X	X	X	X
Noakes, T. (2002). <i>Lore of Running</i> . (4th ed. or earlier). Cape Town: Oxford University Press Southern Africa.			X	X	X
Oatis, C.A. (2008). <i>Kinesiology – The Mechanics and Pathomechanics of Human Movement</i> (2nd ed.). Lippincott Williams and Wilkins. (ISBN: 978-0781774222).	X	X	X		
Pheasant, S., & Haslegrave, C.M. (2006). <i>Bodyspace</i> . 3 <sup>rd</sup> edition. London: Taylor and Francis. (ISBN: 978-0415285209).		X			
Sanders, M.S., & McCormick, E.J. (1993). <i>Human Factors in Engineering and Design</i> (7th ed.). New York: McGraw-Hill. (ISBN: 978-0070549012).			X	X	
Schmidt, R.A., & Wrisberg, C.A. (2000). <i>Motor learning and performance</i> . (2 <sup>nd</sup> edition or later). Xhampaign: Human Kinetics. (ISBN: 0880115009)			X		
Stanton, N., Hedge, A., Brookhuis, K., Salas, E., & Hendrick, H. (2005). <i>Handbook of Human Factors and Ergonomics Methods</i> . Boca Raton: CRC Press. (ISBN: 978-0415287005).			X	X	X
Wilson, J.R. and Corlett, E.N. (1995). <i>Evaluation of Human Work: A practical ergonomics methodology</i> (2nd ed.). London: Taylor and Francis. (ISBN: 978-0748400843).			X	X	X

## 7 Format Guide

Prefaces: This format guide describes some general formal rules of scientific writing and is in this form sufficient for undergraduate laboratory or project reports etc. Postgraduate students are requested to consider additionally the extended (postgraduate) format guide.

Different disciplines may use slightly different formal rules, e.g. for referencing. So do not be surprised if you find minor differences between this guide and other papers. However, this guide is to be considered as standard for any HKE documentation.

### 7.1 Style of writing

The main purpose of writing a report is to communicate clearly and simply what you have done, why you have done it, and what the results mean.

Writing style is very important. Think before you write and group related ideas together in a logical sequence. A “nice to read” type of writing style is, although beneficial, secondary to clear and logic writing. Use the third person singular, as well as past tense in such writing.

Clearly distinguish between logic and facts, information of other sources (e.g. literature) and your own point of view. All those types of information are allowed and welcome if they help to answer a research question, but the reader must be made aware which type of information you are dealing with. The most frequent mistake of this type is to postulate an own opinion in a style that it appears as a fact to the reader. Do not write "The hot weather was fatiguing the subjects" if this is just your thinking and you do not have any evidence for this statement. Better write "It cannot be excluded that the hot weather had an additional impact to the subjects" if you want to point the reader's attention to the hot temperatures.

Write the report as if it is to be read by an intelligent and very sceptical peer. Do not make unsupported assertions. Don't hide behind jargon - if you use a technical term new to you include a brief explanation. Please also note that the term “subject” is becoming outdated and the word “participant” is generally the more desirable one to use, as it indicates willing involvement in the project.

The ten Commandments of Good Writing (according to Howard G. Knuttgen):

- Each pronoun should agree with their antecedent.
- Just between you and I, case is important.
- A preposition is a poor word to end a sentence with.
- Verbs has to agree with their subjects.
- Don't use no double negatives.
- A writer mustn't shift the readers point of view
- When dangling, don't use participles.
- Join clauses good, like a conjunction should.
- Don't write a run-on sentence because it is difficult when you got to punctuate it so it makes sense when the reader reads what you wrote.
- About sentence fragments.

Also consider the following:

- And don't start a sentence with a conjunction
- Always avoid annoying alliteration
- Be more or less specific
- Parenthetical remarks (however relevant) are (usually) unnecessary
- Do not be redundant; do not use more words than necessary; it's highly superfluous
- One should never generalize
- Eschew (avoid) ampersands & abbreviations, etc.
- One word sentences? Eliminate!
- Eliminate commas, that are, not necessary. Parenthetical words however should be enclosed in commas.
- Never use a big word when a diminutive word would suffice
- Use the apostrophe in it's proper place and omit it when its not needed.
- Cut the hyperbole; not one writer in a million can use it correctly.
- Who needs rhetorical questions?
- Exaggeration is a million times worse than understatement.
- Proofread carefully to see if you any words out.

## 7.2 Structure of scientific papers and assignments

Scientific papers and assignments take many forms. They can be short or long, empirical (data are gathered) or literature research, and they can be structured or non-structured. The following will help you prepare your research project / thesis report to suit these various formats. Please note that although this is the preferred way of structuring a research project, there are instances where another format may be more suitable. The supervisor should approve of any modifications to the standard format.

### a) *Structured Assignments*

These are assignments in which specific questions are asked or specific requirements are to be met. The easiest way to deal with this is sequentially, with a clear labelling of your responses to the questions or requirements. The report should have a Title Page (see section 7.3.2), and should you employ references, use the prescribed format (see section 7.3.10). In summary, the structure of the assignments will dictate the format of the report.

### b) *Unstructured Assignments and Project Reports*

These are assignments for which there is no specific structure, as it is also the case for any type of reports. Where the structure is not completely specified use one of the following formats.

#### 7.2.1 Literature Research

Both short and long literature research projects should be presented in sections appropriate to the topic. These sections might progress from the specific towards the general, or they might simply be representative of the various aspects of the topic. Regardless what the content is, the ideas should combine and flow logically to present a complete picture of the topic. The report should have a Title Page (see section 7.3.2) and

all references should follow the prescribed format (see section 7.3.10).

Long literature research projects should also have an Abstract then a Table of Contents following the Title Page. The Abstract is a very short (~200 words) summary of the research.

### **7.2.2 Long Reports of Empirical Data Collection**

Long empirical reports are appropriate for theses at a Masters and PhD level. While Honours research projects are expected to take on the form of a journal article, the main components of a scientific report, as described below, still hold.

Also, due to the large diversity of research projects conducted in the HKE Department, it may not be suitable to follow the same format for each project. As a guideline, reports of major projects which involve data collection should contain the following information in this order, but this is dependent on the type of project, and is up to the discretion of the student and his / her supervisor.

#### Title Page

Short and to the point (see page 37 for example format)

#### Abstract

A very short (maximum 200 words / 1 page) summary of the research. Briefly, eliminating all redundant words, inform the reader of why, how and with what method you undertook the research. The significance of the results and your conclusions should also be stated.

#### Preface or Acknowledgements

Optional.

#### Table of Contents

Contains the headings of divisions of the thesis and the page numbers where they begin.

#### List of Tables

Separate page, following the Table of Contents

Contains the exact title of each table and the page on which it appears

Each table should have a caption at the **top** (Arabic or Roman numerals as long as numbering is applied consistently) that tells concisely just what it contains.

Where tables appear they are numbered sequentially through the text, using Roman numerals ahead of the caption

All textual references to specific tables must be caps. Thus: "It is clear from Table XVII that ..." This rule applies to textual references to the figures as well.

All tables need to be referred to in the main text.

### List of Figures

Contains the exact title of each figure and the page on which it appears.

Each figure should have a caption at the **bottom** (Arabic or Roman numerals) that concisely describes the figure.

Where figures appear they are numbered sequentially through the text, using Arabic numerals.

While liberal use of illustrative material (e.g. photographs) is encouraged, candidates are warned that "show and tell" pictures must do more than just pad the thesis. Each must add substantially to the reader's understanding of the test ambience; orientation of equipment used; characteristics of the subjects. Please note that pasted photographs or hand-drawn figures are generally not acceptable.

PC-generated colour graphics are optional if they enhance the presentation. All graphs and charts should also be clear and intelligible in black and white, since it is in this form that they would appear in most journals.

All figures have to be referred to in text.

### Chapter I - Introduction

The introductory section gives the background to the study performed and details the reasoning leading up to the research hypothesis. This chapter consists of two subparts:

- a) Background and statement of the problem, research question or general hypothesis

Please note that depending on the type of research project, the hypothesis can either be either the statistical hypothesis or the research hypothesis, depending on what is more appropriate for understanding.

- b) Brief overview about the study performed to give the reader an idea what will be focused before getting into details in the following chapters. This part contains:

- Research hypothesis (if suitable, depending on the project) preferably as a "null" hypothesis of what you expect to happen (in the present tense).

Scope of the study (delimitations) – also depends on the project, as it may also suitable in the method or discussion

- Uncontrolled variables which may limit the applicability of the findings (limitations) – again this may also be described elsewhere

Hypothesis:

Often hypothesis repeat themselves with different parameters. Instead of filling pages with repeating the same basic hypothesis just with different parameters, you may use the following terms from the theory of sets:

$$H_0: \mu_{B1} = \mu_{B2} \quad \text{where } B = \{\text{speed, accuracy, response delay}\}$$

This aggregation should however only be used for variable that are part of a bigger set, e.g. different performance parameters or different parameters of



## Heart Rate Variability.

Chapter II - Review of Related Literature

A detailed, logically sequenced discussion of specific issues both directly and indirectly related to your topic, based on a thorough review of relevant literature.

Do not start with a sub-heading titled "Introduction". Also, do not repeat your first chapter again; merely include a brief paragraph that points the reader towards what can be expected in this chapter (known as "signposting").

Please note at the outset that what is required in Chapter II is NOT a review of literature. This may sound paradoxical in view of the common title of Chapter II in postgraduate theses. But think about it: the idea behind the research Project is to demonstrate **creative** research. There is nothing (or very little) creative about copying a summary of what others have had to say. What is required is not a review of literature, so much as a **critical review** of the literature. This does not mean gainsaying everything that other researchers gave had to say. It does, however, mean **evaluating** what other researchers have had to say. Your evaluation requires, as a first step, reviewing the literature: but as a second, more sophisticated step you should produce an **appraisal of the state of knowledge** in the particular area reviewed, and not just a neutral review (copy) of what has been said.

A second warning is important if you aspire to act on the basis of your theoretical knowledge. Do not all into the trap of believing that lengthy corroboration establishes truth. All that you show by citing 100 authors who have corroborated a particular theory is that a particular theory has not collapsed under repeated testing. This **may** be a good reason to go along with the theory; but it is **not** evidence of truth. Citing strings of corroborating authors shows you have done an extensive library search: it does not demonstrate that you have critically evaluated what you have been reading.

- The format for referencing appears on page 40.
- Secondary sources are undesirable and must thus be avoided or, at least, be kept to a minimum.
- Quotations of 3 lines or less do not require changes in layout and do not include page number(s) indicating the source. These are enclosed in quotation mark and cited as one would any other text reference. ONLY in the case of long quoted passages is it necessary to indicate, after the quote (which should be single spaced and indented), the source and the page numbers. A review is not critical if it is no more than a selection of long passages lifted from the works of others. Inclusion of long quoted passages is permitted only in exceptional circumstances.
- Where exactly the same author(s) [in the same order] have produced more than one paper per year, you must number these as in the following example:

Smith *et al.*, (1986a, 1986b, 1986c) and in references list them:

Smith ... 1986a

Smith ... 1986b

Smith ... 1986c

- Citing from the web requires a re-think of your role as a researcher. Why do you think scholarly journals have editorial boards and insist that all submissions be peer-reviewed? What guarantee is there that the “information” you have gleaned on the WWW has been critically appraised and endorsed by leaders in the field? If such guarantees are not in place then the propositions involved have no more relevance in a scholarly context than do the claims of TV adverts.

### Chapter III - Methods

In this section describe your project in sufficient detail to allow someone else to repeat it. It should include the “what”, “how”, and “who” of an experiment:

- a) Research hypothesis (if not already included in Chapter I) and statistical hypothesis / hypotheses
- b) Experimental design (control and special conditions)
- c) Scope of the study (delimitations) – if not already discussed elsewhere
- d) Uncontrolled variables which may limit the applicability of the findings (limitations) – if not already discussed elsewhere
- e) Number and participant characteristics (note: these characteristics describe experiment-relevant conditions, not experimental results. They are “category” IDVs, not experimentally-manipulated responses. Clearly, if you are experimentally changing the % fat content of a sample, the pre-existing % fat data are characteristics, while the altered % fat levels are responses)
- f) Procedures, instrumentation and independent variables
- g) Measurement of dependent and independent variables
- h) Statistical treatment(s) to be used

You are reminded that this is **your** thesis: even in the methods chapter, where you are most likely to be applying well-established methods derived by others, you should strive to “individualize” your presentation. If you used an anthropometric scale, a picture of it in Chapter III would probably be trivial, since scales of this sort are a commonplace. Wherever possible, relegate mundane method-related material (other than methods you have personally developed) to the appendices.

### Chapter IV - Results

Summarise your results using, as appropriate: graphs, figures, tabulations, etc. of means and standard deviations for each experimental condition (see section 7.3 for formal rules). If non-parametric statistics (which consider medians, not means) are used, medians should be included in the tables. Where different classes of variable appear in a table, standard deviations cannot be compared, so include the

coefficient of variation.

Briefly describe (but not discuss) your results.

Include verification / rejection of hypotheses

### Chapter V - Discussion

Relate your results to the literature:

- Do they support or contradict the literature? Why?
- Comment on reasons for unexpected results
- Speculate on theoretical or practical implications of your results.

This section may also include the limitations and delimitations of the study

Support **ALL** statements made in discussion of results by reference to the published literature.

Describing your findings is a means, **NOT** an end: you have barely begun when you experimental findings are carefully elucidated. What follows is the intellectual hub of the whole thesis – what do these findings **mean**? To what extent do they confirm, modify or refute existing doctrine? To what extent do the various facts of your multi-disciplinary investigation interrelate? **These** are the meaningful questions your thesis should address – **these** are the measure of your scholarship.

### Chapter VI - Conclusions and Recommendations

Draw specific conclusions based on your results. Ensure that these conclusions are based on your data.

Provide recommendations for further study based on your findings.

So often these are summarily dismissed. But for the very senior candidate this raises the question why put yourself through all this toil, for so meagre an outcome? Surely to merit the appellation Doctor of Philosophy, you should have a great deal to say on the basis of your results, and a great deal to recommend to those interested in this area. Candidates for less senior degrees should, likewise, aspire to making reasonably profound propositional statements that could not have been made prior to conducting the study.

### References

Refer to section 7.3.10 for details

### Appendices

Refer to section 7.3.11 for details

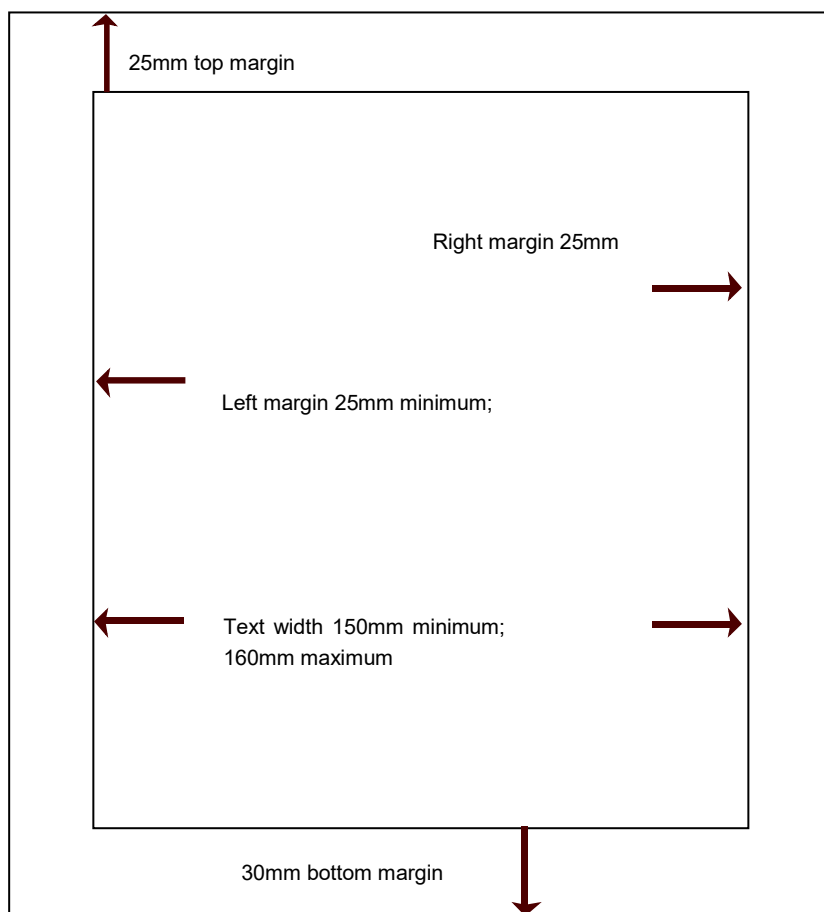
## 7.3 General formats

For any long empirical report / assignment, please use the following HKE format. An MS-Word template can be copied from the departmental Office Administrator or from the HKE website.

### 7.3.1 Page format

Leave:

- 25 mm top margin,
- 25-35 mm left margin (depending on how much space is required for binding),
- 25 mm right margin and
- 30 mm bottom margin (page number centred)



### 7.3.2 Title Page

<p>[TITLE OF PAPER]</p> <p>BY</p> <p>[AUTHORS NAME]</p> <p>PROJECT / THESIS / DISSERTATION [print only the appropriate type]</p> <p>Submitted in [partial] fulfilment of the requirements for the [Course Honours in Human Kinetics and Ergonomics] or [Degree Master of Science]</p> <p>[Name of course or Degree]</p> <p>Department of Human Kinetics and Ergonomics Rhodes University, 2021 Makhanda, South Africa</p>
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Figure 1: Title page layout (text in squared brackets: fill in the appropriate information).

### 7.3.3 Text format

Use ARIAL font 12pt size and a line spacing of 1.5 as standard.

### 7.3.4 Pagination

Every page following the title page in a thesis is assigned a number which appears, centred, at the foot of the page.

- All pages preceding Chapter I are numbered in small Roman numerals
- The first page of Chapter I is page 1 and Arabic numerals continue throughout the remainder of the thesis

### 7.3.5 Quotations

Format for quotations taking more than two or three lines or involving more than one sentence:

Indent both sides. Single-space. Omit inverted commas. At the end of the quoted passage,

state author(s); date; p (or pp) numbers(s).

If the quotation is only one sentence and takes up less than 3 lines: don't indent; don't single-space; place quotation in inverted commas; cite author(s) in the normal way, without indicating page number(s).

### 7.3.6 Unacceptable abbreviations; symbols

You may not start a sentence with an abbreviation or with arabic numerals. Don't use: *Ibid*; *Idem*; *Op cit*; *Loc cit*. (Reason: the modern scientific journals, in ours and related disciplines, avoid this usage).

When you say: "McMaster *et. als*' (1991) study ..." you're advertising several facts; that you don't know how to use abbreviations and that you don't read much, are two of the more obvious.

### 7.3.7 Line breaks

Units of measurement must, along with the numbers involved, be self-contained within a line; do not allow line-breaks to split, as in the examples below:

.....	50
kg.min <sup>-1</sup>	
.....	50 kg.min
-1.	
.....	50 kg.
min <sup>-1</sup> .	

### 7.3.8 Text headings and sub-headings

At the outset decide on a format for headings, sub-headings etc. and apply it consistently. The Department, perhaps injudiciously, has not imposed a format on thesis writers, because it is felt that this might impact negatively on the flow of each individual's means of expression. Some for example, find that numbering (with decimals indicating sub- and sub-sub-headings) facilitates systematic presentation: others find this method stultifying. Candidates are advised to take their lead from the literature and to apply their chosen scheme systematically.

However, if a numbering system is used it may not go beyond the use of two sub-headings *e.g.*:

Heading	=	1
Sub-heading	=	1.1
Sub-sub-heading	=	1.1.1; 1.1.2; 1.1.3; ..... <i>etc.</i>

Headings may not be underlined. They must appear in **bold type**.

### 7.3.9 Figures, tables and equations

The layout of tables and figures in the project / thesis must be compatible with the examples depicted on the following pages.

Tables are to be constructed as in the examples on the next two pages. Note carefully that “fancy artwork” is not permitted in the grid outline format. Use solid vertical and horizontal grids, avoiding excessively wide bold grid-lines.

Also carefully consider the use of colour – a very obvious contrast in colour may not be so when printed in black and white.

All figures and tables have to be referred to in the main text.

Each **figure** should have a numbered caption at the bottom that concisely describes the figure.

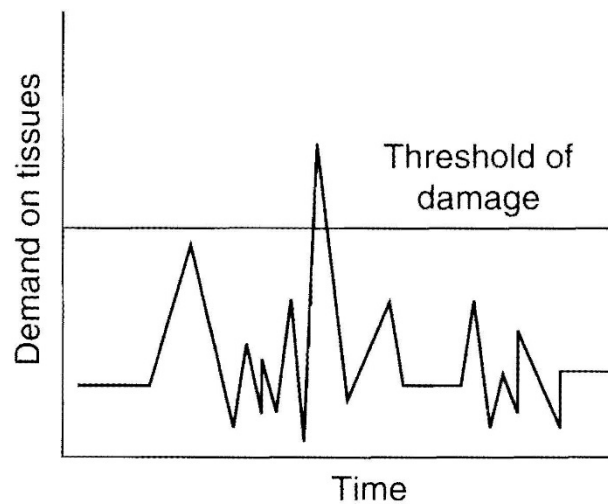


Figure 2: Load-tolerance relationship (taken from Bridger, 2009, p.57).

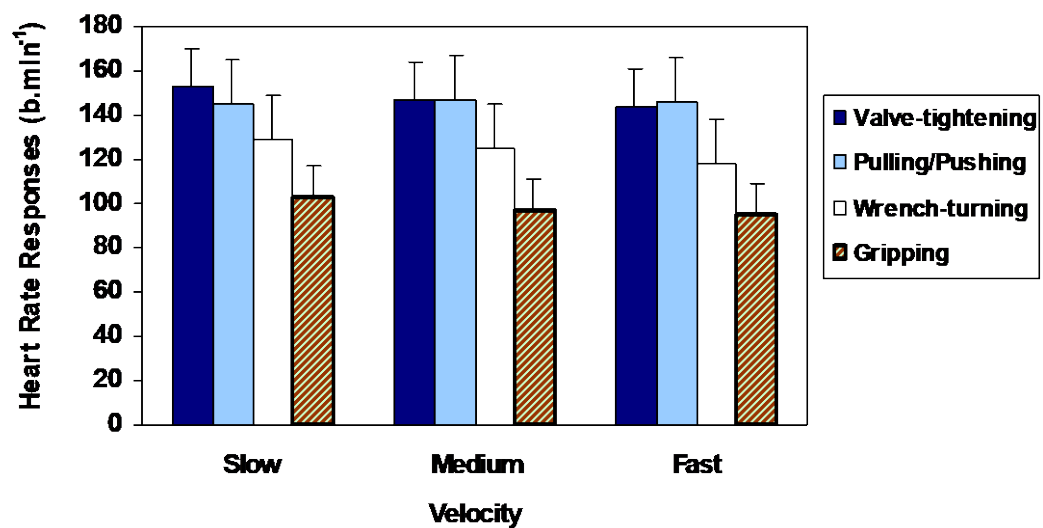


Figure 3: Mean heart rate responses.

Each **table** should have a numbered caption at the top that tells concisely just what it contains. As an option, arabic or roman numbers might be used for tables (but have to be applied consistently throughout the paper).

Table IV: Laboratory Test (LT) responses at Slow Isokinetic Speed ( $30^{\circ}\cdot\text{s}^{-1}$ ): comparisons across joints tested. Means ( $\pm$  SD). \*

Joint	Motion	Peak Torque (Nm·kg <sup>-1</sup> )	Total Work (J·kg <sup>-1</sup> )	Average Power (W·kg <sup>-1</sup> )
Trunk	Extension	3.82 ( $\pm$ 0.78)	4.77 ( $\pm$ 0.82)	1.22 ( $\pm$ 0.26)
	Flexion	3.26 ( $\pm$ 0.46)	4.63 ( $\pm$ 0.49)	1.19 ( $\pm$ 0.16)
Hip	Extension	3.23 ( $\pm$ 0.78)	3.94 ( $\pm$ 1.01)	1.11 ( $\pm$ 0.28)
	Flexion	1.93 ( $\pm$ 0.36)	2.00 ( $\pm$ 0.34)	0.56 ( $\pm$ 0.11)
Knee	Extension	3.34 ( $\pm$ 0.48)	3.11 ( $\pm$ 0.49)	0.90 ( $\pm$ 0.17)
	Flexion	2.09 ( $\pm$ 0.35)	2.39 ( $\pm$ 0.43)	0.72 ( $\pm$ 0.15)

\* None of these tests involved gravity-correction

**Equations** are numbered in parenthesis right to the equation and referenced accordingly. Equations do not have a caption or heading.

Example:

$$A + B = C \quad (\text{eq. 1})$$

Graphs and figures from external sources:

Graphs, figures or whatever may be copied from external sources in its original form if they are correctly referenced. No redrawing or so for the sake of changing the outfit only is required (this is more and more considered as plagiarism if the content is not changed). For reports and theses no permission from authors is required as well. However, publications in journal and books will often require permission of the copyright owners.

### 7.3.10 Referencing

\* Please note that the HKE Department complies with the APA standard of referencing.

More information can be found on <http://www.APA.org>.

#### General rules

- ALL references used must be included in the report / documentation.
- References must be listed in ALPHABETICAL ORDER in the reference list.
- Do NOT number the references.

#### In-text Referencing

Nothing is more boring than an apparently endless stream of:

"Smith (1967) says .... and Brown (1993) **agrees** .... while Jones (1995) **disputes** the theory that..." etc.



Try to vary the manner in which authors are cited in the body of your text. **One** useful way to get the readers' focus on **what** has been said, rather than on **who** said it, is to make the statement and follow it with the author(s) to whom it is attributed, in brackets.

**Table 5:** Examples of reference citations in the text

Direct quote	(Bradley, 1998, p. 276) or Bradley (1998, p. 276)
Paraphrasing with one author	(Bradley, 1998)
Paraphrasing with two authors	(Bradley and Calhoun, 1998)
Paraphrasing with more than two authors	(Bradley <i>et al.</i> , 1998)

For citing more than two authors use the abbreviation *et al.* For example: Smith, James, Jones and Brown would be shortened in text to Smith *et al.* (2000). Note that *et al.*, must only one full stop (after "al.") and be in italics (not bold).

When referencing more than one source in-text, the sequence of authors is listed in chronological order (i.e. in ascending order of their dates), or in order of importance. If two sources with the same date are referenced then these sources are listed in alphabetical order.

Some examples:

"It has been identified (De Vries, 1980 ) that ..."

"Astrand and Rodahl (1977) point out that ..."

"One experiment (Gordon *et al.*, 1983) ....."

"Several authors (Marras *et al.*, 1995; Wilson and Corlett, 1995; Salvendy, 2006) argue that ....."

### Listing primary sources

Generally, list all authors and mark book names and journal titles italics (or bold). In the following, examples of different sources are outlined.

Books:

Spencer, R.F., & Johnson, G.T. (1999). *Applied Physiology* (2nd ed.). Cape Town: Harper and Collins Publishers.

Chapters in edited volumes:

Spencer, R.F., & Johnson, G.T. (1997). The basic principles of Applied Physiology. In T. Cohen, & R. Godman (Eds), *Early studies into work physiology* (pp. 120-125). New York: Harper and Row Publishers.

Journal Articles:

Cann, R.L., & Brown, W. (1991). Acceleration and speed as factors in human performance. *American Journal of Sports Medicine*, 21(1), 120-125.

Brage, S., Ekelund, U., Brage, N., Hennings, M.A., Froberg, K., Franks, P.W., & Wareham, N.J. (2007). Hierarchy of individual calibration levels for heart rate and

accelerometry to measure physical activity. *Journal of Applied Physiology*, 103, 682-692.

Conference proceedings:

Scott, P.A., & Charteris, J. (1995). Lifting in South African Industry. *Proceedings: Joint IEA World Conference and 2<sup>nd</sup> South African Congress. Cape Town, 12-20 July 2000*, 500-520.

Theses:

Almeida, D.M. (1990). *Father's anticipation of family work*. Unpublished Master's thesis, University of Victoria, British Columbia, Canada.

World wide web:

Christie, C.J. (2001). *Case Study: Aerobic Capacity*. URL: <http://www.ru.ac.za/aerobic>. Last accessed: 17 August 2008.

#### Referencing secondary sources

Secondary sources are references which were not directly consulted, but only gathered (re-cited) from primary sources. Wherever possible, go to the original reference rather than someone else's interpretation of the reference. But you are allowed to use secondary sources if you indicate this correctly; however secondary sources should be kept to an absolute minimum and used only when the original article is not available.

If you are using a secondary source in your work, you must use the following format:

Within the text you acknowledge the author/s and date of the secondary source like a primary source, e.g. "McGill (2002, as cited in Bridger, 2009) stated that .....".

In the reference list you then include only the primary source, i.e. in this example: Bridger, R.S. (2009). *Introduction to Ergonomics* (3rd edition). Boca Raton: CRC press.

#### **7.3.11 Appendices**

In an appendix or appendices any material supportive should be included which would interfere with the flow of the report if contained within the body of the report, such as:

- raw data
- lists of items too lengthy to include in results
- supportive letters
- ancillary information

Each new type of material should be contained within its own appendix. Label Appendix A / Appendix B etc.

## **7.4 Statistical Terms**

Statistics use some defined terms that can cause misconceptions if not applied appropriately. Mainly the following terms must be considered for theses in the HKE domain:

*Significant / significance*: The expression *significant* is used if a statement is underpinned

by a statistical error probability that is below a set acceptance level (e.g.  $p < 0.05$ ; see below). As a consequence the expression *significant* must not be used without statistical confirmation in order to avoid misinterpretation.

*Error probability* (e.g.  $p < 0.05$ ): Refers to the probability of a Type I error (or  $\alpha$ -error) when using inferential statistics (see Figure 4). The error probability is the probability of obtaining the observed effect when in fact the null hypothesis is true.

		Actual Situation	
		No effect ( $H_0 = \text{true}$ )	Effect exists ( $H_0 = \text{false}$ )
Researcher's Decision	Reject $H_0$	<b>Type I / <math>\alpha</math> error</b>	Correct decision
	Accept $H_0$	Correct decision	<b>Type II / <math>\beta</math> error</b>

Figure 4: Errors in hypothesis testing.

*Statistical power*: This refers to the probability of a Type II error (or  $\beta$ -error), that is the probability that no effect was found, but in fact, an effect does exist (see Figure 4). Statistical power expresses the probability of not making a Type II error ( $= 1 - \beta$  or  $1 - p$ ). For most statistical applications the *statistical power* is set to minimum 0.80, corresponding to a  $\beta$ -error probability of  $< 0.2$ .

*Effect size / magnitude of effect*: Refers to the measure of the strength of the relationship between two (or more) variables in a statistical population. The *absolute effect size* describes the difference between the means that describe the effect (e.g. the heart rate difference between carrying two different loads). However, it needs to be considered that the (measured) means of the data samples are not 100% identical to population means, and, thus, the sampling error must be considered as well. For the relative effect size the ratio between the difference between the means and the total variance is calculated (which is similar to the proportion of *explained variance*, see below).

*Explained variance*: Indicates the strength of the relationship between two (or more) variables in a statistical population, compared to (more precisely: in relation to) the effect of all factors. Technically this is the proportion of common variance between two variables relative to the total variance. For the Pearson correlation coefficient the proportion of *explained variance* corresponds to  $R = r^2$ .

*Confidence interval (CI)*: This is the interval covering a set percentage of a population around the average, typically 90% or 95% of a population. This term is typically (but not exclusively) applied to normally distributed data. In this case it is defined by the average value  $\pm$  a multiple of the standard deviation.

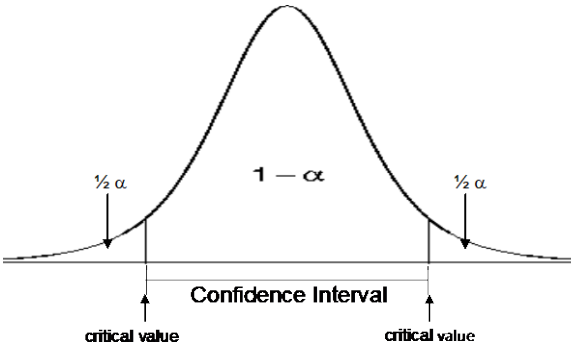


Figure 5: Confidence intervals of normally distributed data.