



Tutorial Letter 101/3/2018

Organisational Research Methods

IOP2601

Semesters 1 and 2

Department of Industrial and Organisational Psychology

This tutorial letter contains important information
about your module.

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1 INTRODUCTION

Dear Student

Welcome to IOP2601 and congratulations on passing your first year of study and joining us for this second-year module. We trust that you will find this specific module interesting and that it will also be of practical value to you in your work situation.

Conducting research is a very important aspect of an industrial and organisational psychologist's work. Throughout your studies you will come across the topic of research several times. In this module we look at a specific part of the process of conducting research, namely analysing the quantitative or numeric information that you have collected in a research project. For example, say an organisation is interested in finding out whether its employees, who are satisfied with their working conditions, are likely to be more productive than dissatisfied employees are. Or maybe an organisation wants to know if there is a difference in the working preferences of various generational groups. Once the relevant information has been collected, one can apply some data analysis techniques to answer these questions in a scientific and valid manner. You will learn more about applying and interpreting these data analysis techniques in this module.

This tutorial letter contains important information on your study programme for the semester, whether you are enrolled for the first or second semester. Please read it carefully before you start your studies and always keep it close at hand. During this semester you will have to work hard, but with the necessary motivation and a regular study programme, you should be able to look back at the end of the semester on the successful completion of another module. We wish you all the best!

2 PURPOSE AND OUTCOMES

2.1 Purpose

This module is intended for all people pursuing a career in the field of industrial and organisational psychology or practitioners in the field of human resources. Students who successfully complete this module will be able to develop a solid knowledge base and sound understanding of how to calculate and interpret basic descriptive and inferential statistics as part of a research project in an organisational context. They will also be able to demonstrate solid knowledge and a sound understanding of the key terms and terminology, as well as rules and principles that apply to basic descriptive and inferential statistics in industrial and organisational psychology. In addition, they will be able to effectively select and apply appropriate descriptive and inferential statistical techniques that are commonly used in industrial and organisational psychology.

2.2 Outcomes

For this module, there are several outcomes that we hope you will be able to accomplish by the end of the course:

- **Specific outcome 1:** Explain the basic principles and concepts of scientific research of a quantitative nature and the process of conducting research.
- **Specific outcome 2:** Describe a dataset by using descriptive statistics.
- **Specific outcome 3:** Explain basic concepts of inferential statistics.
- **Specific outcome 4:** Conduct hypotheses testing by using inferential statistics.

3 LECTURERS AND CONTACT DETAILS

3.1 Lecturers

Your lecturers for the module are listed below. Please take note that the lecturers welcome interaction with students, but that only academic-related questions and enquiries concerning the content of the course should be directed to the lecturers – for example, when you need clarity about concepts in the study material, the content in assignments and the examinations.

<p>Dr Nomfusi Bekwa Office number: AJH van der Walt Building 3-91 Telephone number: +2712 429 8054/8033 E-mail address: deptiop@unisa.ac.za</p>	<p>Ms Wendy Mvana-Dyosi Office number: AJH van der Walt Building 3-80 Telephone number: +2712 429 8054/8033 E-mail address: deptiop@unisa.ac.za</p>
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- **Lecturer availability**

Lecturers are generally available during the day from 8:30 to 16:00, to take phone calls on academic matters and/or to attend to students who may prefer to visit personally for academic engagement. However, the days and times of lecturers' availability will be communicated in the module page on myUnisa. These days and times are subject to change from time to time in order to accommodate the lecturers' work schedules and other commitments. The changes on the days and times will be communicated by the lecturer in advance through the announcement option on myUnisa as and when this happens. Students are advised to check the module page on myUnisa before making phone calls or visiting the lecturer's office for academic enquiries/engagements.

3.2 Department

The Department of Industrial and Organisational Psychology is in the AJH van der Walt Building, 3rd Floor, Room 3-98.

You can contact the department at:
 Tel: 012 429 8033 or 012 429 8054
 E-mail: deptiop@unisa.ac.za

3.3 University

To contact the university, you should follow the instructions in the brochure, **Study @ Unisa**. Remember to have your student number available whenever you contact the university.

You should also always include your student number whenever you contact the lecturer. This will help the lecturers to help you.

4 MODULE-RELATED RESOURCES

The study material for IOP2601 consists of a study guide and tutorial letters. Please refer to section 4.1 for the prescribed book for this module. The study material for IOP2601 that you should have received from the Department of Despatch includes the following:

Study Guide	This is the study guide for the module.
Tutorial Letter 301/3/2018	This is a general tutorial letter and contains important information about your study process at Unisa that is not contained elsewhere. Please read it carefully.
Tutorial Letter 101/3/2018	This tutorial letter contains information on all the assignments for module IOP2601.
Tutorial Letter 201/1/2018 or Tutorial Letter 201/2/2018	This tutorial letter contains feedback on Assignments 01 and 02 as well as information on the examination.

Please note that some of this tutorial matter may not be available when you register. Tutorial matter that is not available when you register will be posted to you as soon as possible, but you do not have to wait – you can go online as soon as you register and all your study materials will be there on myUnisa.

4.1 Prescribed books

The module has a **prescribed book** that you have to purchase:

Tredoux, C. & Durrheim, K. (Eds). (2013). *Numbers, hypotheses and conclusions: a course in statistics for the social sciences*. (2nd ed.). Lansdowne: UCT Press. [ISBN: 978-1-77582-000-0]

A CD accompanies the prescribed book. We will not be using the CD as part of our official material for this module. You are, however, welcome to explore some of the additional discussions and exercises on the CD for your own benefit.

Prescribed books can be obtained from the university's official booksellers. Please refer to the list of official booksellers and their addresses in the *Study @ Unisa* brochure. If you have difficulty in locating your book(s) at these booksellers, please contact the Prescribed Book Section at telephone number 012 429 4152 or e-mail: vospresc@unisa.ac.za.

4.2 Recommended books

None.

4.3 Electronic reserves (e-reserves)

None.

4.4 Library services and resources information

For brief information, go to www.unisa.ac.za/brochures/studies

For detailed information, go to <http://www.unisa.ac.za/library>. For research support and services of personal librarians, click on "Research support".

The library has compiled a number of library guides:

- finding recommended reading in the print collection and e-reserves – <http://libguides.unisa.ac.za/request/undergrad>
- requesting material – <http://libguides.unisa.ac.za/request/request>
- postgraduate information services – <http://libguides.unisa.ac.za/request/postgrad>
- finding, obtaining and using library resources and tools to assist in doing research – http://libguides.unisa.ac.za/Research_Skills
- how to contact the library/finding us on social media/frequently asked questions – <http://libguides.unisa.ac.za/ask>

PLEASE NOTE: You can find all your tutorial letters, the study guide and previous examination papers on myUnisa in the “Official Study Material” folder. We will also provide a Tutorial Workbook in “Additional Resources” of myUnisa, which has additional exercises to aid you in understanding the content.

5 STUDENT SUPPORT SERVICES FOR THE MODULE

Important information appears in your *Study @ Unisa* brochure.

5.1 Discussion classes

There are no discussion classes for IOP2601. Please contact your lecturers if you need any help with the learning content.

5.2 Tutorial support programme and study groups

The tutorial support programme (TSDL) is an additional programme or support provided by the TSDL department. **Please note** that these classes are not presented by lecturers.

What is the tutorial support programme?

It is an optional and voluntary programme that provides students with weekly, face-to-face tutorials led by suitably qualified **tutors** in the modules that you are registered for. It is presented at the various learning centres where you can discuss your course material with the tutor and other students.

How does it work?

- A minimum of 15 students is needed to start a tutorial programme.
- Tutorials take place once a week for an hour, or every second week for two hours at the various learning centres.
- 30 sessions per course or 15 hours per module are presented.
- Classes are usually scheduled after hours (after 17:00) on weekdays or on Saturdays from 08:00.
- Classes run from early February for the 1st semester and early July for the 2nd semester.

How do I enrol?

Visit your nearest Learning Centre as soon as you have registered at Unisa.

- Find out from the Learning Centre if there are tutorials being presented for the specific module that you are registered for (it depends on the interest of students – a minimum of 15 students is needed to start a tutorial).
- Find out from the Learning Centre about the fees and the date when the tutorials for your modules will start.

Please note that registration at a Unisa Learning Centre is not compulsory. If you are interested, you may contact the tutors through the centre's coordinators, whose names and contact details are available in your *Study @ Unisa* brochure.

If you need to know the address of the regional centre closest to you, please contact Ms Salome Mamadisa at 012 429 3538, or e-mail: mamads@unisa.ac.za, or look up your regional centre in your *Study @ Unisa* brochure.

Study groups

It is advisable to have contact with fellow students. One way to do this is to form study groups. You can utilise myUnisa for this purpose to form online study groups. The addresses of students in your area may also be obtained from the following department:

Directorate: Student Administration and Registration
PO Box 392
UNISA
0003

If you need a list of the names of fellow students in your region, please contact the Unisa Student Support Centre at the numbers listed in your *Study @ Unisa* brochure. You can also find information on the various student support systems and services available at Unisa (e.g. student counselling, tutorial classes, language support) in this brochure.

5.3 Online support/myUnisa for IOP2601

If you have access to a computer that is linked to the internet, you can quickly access resources and information at the university. The myUnisa learning management system is Unisa's online campus that will help you communicate with your lecturers, with other students, and with the administrative departments of Unisa – all through the computer and the internet. Therefore, it is an efficient way of establishing study groups with fellow students. You will also be able to download all the study material for IOP2601 from the myUnisa website.

To go to the myUnisa website, start at the main Unisa website, <http://www.unisa.ac.za>, and then click on the "Login to myUnisa" link on the right-hand side of the screen. This should take you to the myUnisa website. You can also go there directly by typing in <http://my.unisa.ac.za>. When you are on the myUnisa website, click on the "Claim UNISA Login" on the right-hand side of the screen. You will then be prompted to give your student number to claim your initial myUnisa details as well as your myLife login details.

If this will be the first time you are accessing this website, you will be required to complete a joining procedure and allocate yourself a password. Look for the **Join myUnisa** link on the web page. Note that you cannot join myUnisa without a functional e-mail address. Make sure that you

verify all your details carefully when you complete the joining procedure. Once you have joined and registered successfully, you will be able to access information about all your courses.

There will also be a Help Desk available to help you with any problems you might have about how to get to the online course pages. You can contact the Help Desk at 012 429 8033 and 012 429 8054.

- **E-tutors**

Once your registration has been finalised, you will be allocated an e-tutor. The role of the e-tutors is to provide academic support to students by interpreting assignment questions and tutorial matter and explaining difficult concepts to the students. A tutor site will be created on myUnisa to enable students to liaise with their allocated tutor. All the tutors have been appointed with the approval of the Department of Industrial and Organisational Psychology. They are all fully qualified and are knowledgeable in this field of study. It is important, however, not to confuse their role with that of lecturers. The role of the tutor is to facilitate learning. Tutors are not lecturers, so students should not expect tutors to provide a teacher/learner environment, but rather an environment in which tutors and students can share and discuss the study material.

5.4 The Unisa Library

The librarian responsible for the information needs of the **Department of Industrial and Organisational Psychology** is:

Mélanie Malan
malanmm@unisa.ac.za
Tel: +2712 429 3595
Fax2email: +2786 659 8536

Unisa Library login

You will be required to provide your login details, i.e. your student number and your myUnisa password, in order to access the library's online resources and services. This will enable you to:

- view or print your electronic course material
- request library material
- view and renew your library material
- use the library's e-resources

6 MODULE-SPECIFIC STUDY PLAN

Here is a suggestion of how you can work through the content of this module during this semester. Remember that this is only a guideline and that you also need to take your other modules into account when planning your studies. Use your *Study @ Unisa* brochure for general time management and planning skills.

WORK SCHEDULE – activities per week	
Week 1 29 Jan – 2 Feb <i>[16 Jul – 20 Jul]</i>	Registrations close: Buy the prescribed book and obtain the study guide (also available from myUnisa).
Week 2 5 Feb – 9 Feb <i>[23 Jul – 27 Jul]</i>	Work through learning unit 1 of your study guide.
Week 3 12 Feb – 16 Feb <i>[30 Jul – 3 Aug]</i>	Work through learning units 2 and 3 of your study guide.
Week 4 19 Feb – 23 Feb <i>[6 Aug – 10 Aug]</i>	Work through learning units 4 and 5 of your study guide.
Week 5 26 Feb – 2 Mar <i>[13 Aug – 17 Aug]</i>	Work through learning units 6 and 7 of your study guide.
Week 6 5 Mar – 9 Mar <i>[20 Aug – 24 Aug]</i>	Work through learning unit 8 of your study guide.
Week 7 12 Mar – 16 Mar <i>[27 Aug – 31 Aug]</i>	Use this week to finalise Assignment 01.
Week 8 19 Mar – 23 Mar <i>[3 Sep – 7 Sep]</i>	Work through learning units 9 and 10 of your study guide.
Week 9 26 Mar – 30 Mar <i>[10 Sep – 14 Sep]</i>	Work through learning units 11 and 12 of your study guide.
Week 10 2 Apr – 6 Apr <i>[17 Sep – 21 Sep]</i>	Work through learning units 13 and 14 of your study guide.
Week 11 9 Apr – 13 Apr <i>[24 Sep – 28 Sep]</i>	Use this week to finalise Assignment 02.
Week 12 16 Apr – 20 Apr <i>[1 Oct – 5 Oct]</i>	Work through learning unit 15 of your study guide.
Week 13 23 Apr – 27 Apr <i>[8 Oct – 12 Oct]</i>	Work through learning unit 16 of your study guide.
Week 14 30 Apr – Exams <i>[15 Oct – Exams]</i>	Use this time to do revision and preparation for the examination.

7 PRACTICAL WORK AND WORK-INTEGRATED LEARNING

There is no practical work or integrated learning for this module.

8 ASSESSMENT

8.1 Assessment criteria

Specific outcome 1

Explain the basic principles and concepts of scientific research of a quantitative nature and the process of conducting research.

Assessment criteria

- The characteristics of the scientific approach to research are explained.
- The quantitative research process followed in a research project is described.
- A variable is defined, a distinction is made between discrete and continuous variables, and independent and dependent variables and examples of each are provided in a quantitative study.
- Nominal, ordinal, interval and ratio scales are distinguished, and examples are provided of each.
- Various concepts of quantitative data like descriptive versus inferential statistics, population versus sample, parameters versus statistics and measurement data versus categorical data are defined and distinguished, and examples are provided of each.

Specific outcome 2

Describe a dataset by using descriptive statistics.

Assessment criteria

- A frequency table is compiled, and a frequency polygon and a histogram are also drawn and described in terms of the characteristics of skewness and kurtosis. The graphic representation in terms of type and characteristics on computer printouts are identified as well.
Range statement: Compiling a frequency table and drawing a frequency polygon and a histogram include grouped and ungrouped data. Skewness includes symmetrical, bimodal, unimodal, negatively skewed and positively skewed distributions. Kurtosis includes platykurtic, leptokurtic and mesokurtic distributions.
The measures of central tendency (mode, median and mean) are described and computed, mention is made of the advantages and disadvantages of each of the three measures of central tendency, and each measure for the various types of distributions (normal, bimodal, positive and negative distributions) are identified. The mean value on computer printouts is identified and interpreted.
- Variability is described, the three measures of variability (range, variance and standard deviation) are defined, computed and interpreted, and variance and standard deviation are identified and interpreted on a computer printout.
- The concept of correlation and the factors that influence correlation are described. Pearson's product moment correlation coefficient is computed and interpreted in terms of strength (using the correlation interpretation scale), nature (using the correlation interpretation scale), the deductions that can be made, and the proportion and percentage of common variance as well as effect size. The correlation between two specific variables is identified correctly from a correlation matrix and interpreted from a computer printout. The variables' data set is plotted on a scatter diagram and the relationship displayed on the graph is interpreted in terms of the correlation between the variables.

- Regression is described and how accuracy of prediction is linked with correlation is explained. The general regression equation is identified, the b -value (slope) and the a -value (intercept) are computed, Y -values predicted by substituting a , b , and given X -values in the equation and a graphical representation of this regression line are given. The slope (b), intercept (a) and regression coefficient on a computer printout are identified and interpreted correctly.

Specific outcome 3

Explain basic concepts of inferential statistics.

Assessment criteria

- The normal distribution as well as the standard normal distribution is described. The importance of the standard normal distribution is explained and illustrated graphically.
- The linear transformation of computing z -values is performed, proportions identified from the relevant table and interpreted in terms of percentages and number of cases.
- Limits of confidence for observations are calculated and interpreted.
- The terms and laws of probability are explained.
- *Range statement:* The terms of probability include event, independent event, mutually exclusive and exhaustiveness. The laws of probability include the additive and multiplicative laws.
- The concepts of joint, conditional and unconditional probability are described and distinguished and probability is computed.
- Random sampling, sampling distribution and sampling error are described, and a sampling distribution is illustrated with a diagram.

Specific outcome 4

Conduct hypotheses testing by using inferential statistics.

- *Range statement:* The steps in hypotheses testing include, but are not limited to, formulating a null hypothesis, formulating the alternative hypothesis, determining whether the test is one-tailed or two-tailed, determining the level of significance, computing the test statistic, determining the degrees of freedom, determining the critical value, rejecting or not rejecting the null hypothesis, and interpreting the findings.

Assessment criteria

- The concept hypothesis is described, it is explained where hypotheses fit into the research process, and the steps of the process of hypothesis testing are discussed in detail.
- The correct test statistic is identified to be used to answer a specific research question based on quantitative data.
- *Range statement:* The types of research questions are limited to include two related samples, two independent samples, three or more independent samples, and categorical data.
- The steps in statistical hypothesis testing are applied to a t -test for two related samples, a t -test for two independent samples, and a one-way ANOVA.
- *Range statement:* The application of test statistics (two related samples, two independent samples and three or more independent samples) is restricted to normally distributed measurement (quantitative) data. The test statistic for three or more independent samples is restricted to those with one independent variable (one-way ANOVA).
- The applicable non-parametric equivalents of a t -test for two related samples, a t -test for two independent samples, and a one-way ANOVA are listed.
- A computer printout of the results of a t -test for two related samples, a t -test for two independent samples, and a one-way ANOVA is interpreted.

- The correct test statistic for categorical (frequency) data (“goodness-of-fit” test and two-way table) is identified from a problem statement.
- The chi-square test statistic is applied within the process of hypothesis testing and interpreted from a computer printout.
- *Range statement:* The chi-square test statistic is restricted to normally distributed categorical (frequency) data and includes the “goodness-of-fit” test for one classification variable and a two-way table for two classification variables.

8.2 Assessment plan

During this semester you will have to complete two assignments to acquire a year mark and gain admission to the examination. The third assignment is for self-evaluation purposes. Assignments 01 and 02 will be different for semesters 1 and 2, and you must do the assignments set for the semester in which you are registered. You are advised to do all three assignments; this will help you to cover the entire course content and will give you practice in doing different types of statistical calculations. The assignments entail the following:

Assignment 01

This assignment is **compulsory** and should be submitted to gain admission to the examination. This assignment also makes up half of your year mark.

Format

Assignment 01 consists of multiple-choice questions and should be completed on a mark-reading sheet. Use the unique assignment number provided in section 8.3.2 below. See section 8.3 below for the procedure to submit this assignment to the university.

Content covered

Outcomes 1 and 2 and learning units 1 to 8 in the study guide are covered in this assignment.

Feedback

You will receive feedback on this assignment in Tutorial Letter 201, which will be available on myUnisa and sent to you on the closing date of the second assignment.

Assignment 02

This assignment is **compulsory** and makes up half of your year mark.

Format

Assignment 02 is a written assignment that consists of short questions and calculations. Assignment 02 should be completed on the answer sheet that is provided at the end of the assignment in this tutorial letter or under **Additional Resources** on the myUnisa site. See section 8.3 below for the procedure to submit this assignment to the university.

Content covered

Outcomes 3 and 4 and learning units 9 to 14 in the study guide are covered in this assignment.

Feedback

You will receive feedback on this assignment in Tutorial Letter 201, which will be available on myUnisa and sent to you on the closing date of the second assignment.

Assignment 03

This assignment is **not compulsory** and is a self-evaluation assignment. This assignment **should not be submitted** to the university.

Format

Assignment 03 is a written assignment that consists of short questions and calculations. Learning unit 16 in the study guide acts as Assignment 03.

Content covered

This assignment is a revision of the entire course content that you have covered.

Feedback

Feedback is provided in learning unit 16 of the study guide.

8.3 Assignment numbers

8.3.1 General assignment numbers

As indicated above, the assignments are numbered as Assignment 01, Assignment 02 and Assignment 03.

8.3.2 Unique assignment numbers

Use the following unique assignment numbers when submitting assignments.

Semester	Unique number
Assignment 01 Semester 1	742399
Assignment 02 Semester 1	869757
Assignment 01 Semester 2	764289
Assignment 02 Semester 2	679079

8.4 Assignment due dates

See the following table for the due dates of your assignments.

Assignment	Semester 1	Semester 2
Assignment 01	19 March 2018	3 September 2018
Assignment 02	16 April 2018	1 October 2018

8.5 Submission of assignments

Students may submit written assignments and assignments completed on mark-reading sheets either by post **or** mobile MCQ submission **or** electronically via myUnisa. Assignments **may not** be submitted by fax or e-mail.

To submit an assignment via myUnisa:

- Go to myUnisa.
- Log in with your student number and password.
- Select the module.
- Click on assignments in the menu on the left-hand side of the screen.
- Click on the assignment number you wish to submit.

- Follow the instructions.

For detailed information on assignments, please refer to the *Study @ Unisa* brochure, which you received with your study package.

8.6 The assignments

The assignments are presented as Appendix A.

SEMESTER 1: JANUARY TO JUNE

Assignment 01 Compulsory

Assignment 02 Compulsory

Assignment 03 Self-assessment

SEMESTER 2: JULY TO NOVEMBER

Assignment 01 Compulsory

Assignment 02 Compulsory

Assignment 03 Self-assessment

8.7 Other assessment methods

None.

8.8 The examination

The examination paper will be made up as follows:

Duration:	2 hours
Total marks:	70
Composition:	short questions and calculations

- **Examination admission**

If Assignment 01 is submitted on time, that is, before or on the due date, you will gain examination admission. Your mark for this assignment will not influence your examination admission. See the calculation of the year mark and final mark below.

- **Examination preparation**

We suggest that you work through the study guide thoroughly, and where reference is made to sections and pages in the textbook, you can summarise those sections for yourself and integrate them with your study guide notes. In this way, when you start your revision for the examination, you should be able to focus on the study guide and your own notes.

We also include a past examination paper with its memorandum in Tutorial Letter 201 to give you an indication of the format of the examination and the type of questions that you could expect in the examination. More previous examination papers can be accessed on myUnisa under the **Official Study Material** folder. Unfortunately, no memorandums are provided for these.

Use your *Study @ Unisa* brochure for general examination guidelines and examination preparation guidelines.

- **Year mark and final examination**

Your marks for Assignments 01 and 02 will each contribute 50% towards a year mark of 20%, which will be added for your final mark. Please see the following box for details of how the year mark is calculated.

FINAL MARK = YEAR MARK + EXAMINATION MARK

Your year mark, based on the average mark obtained for the two compulsory assignments (each contributes 50%), contributes 20% toward your final examination mark, while your examination mark contributes 80%.

The combined weighted average of your year mark and examination mark must be 50% or higher for you to pass the module/subject. However, you must obtain a minimum of 40% in the examination, regardless of your year mark. If you obtain less than 40% in the examination, you will fail.

For example:

Assignment marks of Assignments 01 and 02 = 70% and 70% = $140/2 = 70\%$

20% of the assignment marks = 14%

Examination mark = 50%

80% of the examination mark = 40%

Final mark = (20% assignment marks) + (80% examination mark)

= 14% + 40%

= 54%

Remember that the better your assignment marks, the better your year mark. It is therefore imperative that you do well in both assignments in order to obtain the benefit of good marks to be added to your examination mark.

Please note: If you fail in the examination with less than 40%, your year mark will not be taken into account in calculating your final mark for the module.

9 FREQUENTLY ASKED QUESTIONS

- ***Must I purchase the prescribed book?***

Yes – it is important to have both the prescribed book and the study guide for success in this module.

- ***What kind of calculator can I use?***
You must have a pocket calculator (non-programmable) for the module, which is also admissible to the examination. We advise that your calculator should have at least the square root ($\sqrt{\quad}$) and the memory (M+) facilities.
- ***I have not done maths – can I pass this module?***
Yes – although the module includes formulas and calculations that can be intimidating to some students, it is important to note that many students who have been in the same position were able to go through the module and pass quite well. There is a learning unit (learning unit 3) that will take you through the basic principles of the calculations that will be used throughout the module. Once these principles are mastered, you should be able to approach the rest of the module with confidence.
- ***Do I need to know the formulas by heart?***
No – although you do not need to memorise formulas, you must be able to recognise them from the list of formulas provided in the examination paper and you must be able to use them in calculations. Only the formulas as given in the study guide will be provided.

10 IN CLOSING

Do not hesitate to contact your lecturer by e-mail if you are experiencing problems with the content of this tutorial letter or with any aspect of the module.

We wish you a fascinating and satisfying journey through the learning material and trust that you will complete the module successfully.

Enjoy the journey!

Your IOP2601 lecturers
Nomfusi Bekwa
Wendy Mvana-Dyosi

11 ADDENDUM

Appendix A: Assignments

PLEASE TAKE NOTE:

We provide two different compulsory assignments for each semester. Choose the assignments for the semester that you are registered for.

SEMESTER 1

JANUARY TO JUNE

ASSIGNMENT 01

Closing date:	19 March 2018
Total:	30 marks
Study material:	Learning units 1 to 8
Unique number:	742399

This compulsory assignment consists of multiple-choice questions that should be completed on a **mark-reading sheet** (which you received with your study material) and must then be submitted to the university. Please refer to the *Study @ Unisa* brochure on how to complete the mark-reading sheet.

QUESTIONS (1) TO (30): MULTIPLE-CHOICE QUESTIONS [30]

- (1) Students who could not submit Assignments 01 and 02 can submit Assignment 03 to gain credit marks. Is this statement true or false?
1. True.
 2. False.
- (2) The use of a non-programmable calculator is permissible in the examination of IOP2601. Is this statement true or false?
1. True.
 2. False.
- (2) Assignment 01 covers specific outcomes 1 and 2. Is this statement true or false?
1. True.
 2. False.
- (4) The research process starts with writing the research problem. Is this statement true or false?
1. True.
 2. False.
- (5) Which one of the following statements is true about IOP2601?
1. The module focuses on identifying research questions and drawing conclusions.
 2. The module entails techniques of collecting and interpreting research information.
 3. The module focuses on the fourth step of the research process of analysing data.
 4. The module mainly focuses on drawing conclusions about the relationships of variables.

Use the table below to answer questions 6 to 10.

Class interval	Real limits	Midpoint	f	Cumulative f	% f	Cumulative % f
75 – 80	74,5 – 80,5	77,5	8	50	16	100
69 – 74	68,5 – 74,5	71,5	10	42	20	84
63 – 68	62,5 – 68,5	65,5	12	32	24	64
57 – 62	56,5 – 62,5	59,5	8	20	16	40
51 – 56	50,5 – 56,5	53,5	5	12	10	24
45 – 50	44,5 – 50,5	47,5	7	7	14	14

- (6) The class interval width for this distribution is _____.
1. 5
 2. 6
 3. 4
 4. 11
- (7) When determining the percentile rank of a score of 60, the percentage (%) below you will substitute for the formula is _____.
1. 64
 2. 40
 3. 24
 4. 16
- (8) When determining the percentile rank of a score of 60, the real lower limit (RLL) you will substitute for the formula is _____.
1. 56,5
 2. 59,5
 3. 50,5
 4. 57
- (9) What score is found at the 25th percentile?
1. 56,88
 2. 58,75
 3. 10
 4. 7,5
- (10) What is the total of the scores in the distribution?
1. Not enough information is provided.
 2. 100
 3. 50
 4. 80

(11) The score in a dataset that occurs with the greatest frequency is known as _____.

1. mode
2. mean
3. median
4. range

Use the information below to answer questions 12 and 13.

15, 7, 10, 17, 30, 67, 111, 102

(12) The median location for dataset is _____.

1. 5,5
2. 4,5
3. 33
4. 24

(13) The median for the dataset is _____.

1. 17,5
2. 18
3. 25
4. 23,5

(14) A range is that score above and below which 50% of the scores in a sample fall. Is this statement true or false?

1. True.
2. False.

(15) The mode for the dataset of 8, 7, 8, 7, 1, 7, 2, 7, 5 and 6 is _____.

1. 7
2. 1,5
3. 5,5
4. 5

(16) The standard deviation of a set of data can never be a negative number. Is this statement true or false?

1. True.
2. False.

- (17) When calculating a variance, a value of -1,2 represents which one of the following statements?
1. All observations were at the mean.
 2. The distribution is very negatively skewed.
 3. The distribution is positively skewed.
 4. You would never obtain a negative variance.
- (18) A correlation coefficient of -1,50 shows _____.
1. a strong negative correlation.
 2. a moderate negative correlation
 3. a calculation error has been made
 4. you would never obtain a negative correlation coefficient
- (19) The most important difference between correlation and regression is that the latter is _____.
1. used to investigate the relationship between variables
 2. used only to compare groups among themselves
 3. can be computed for only two variables
 4. used to make predictions
- (20) A correlation of 0,55 represents a _____.
1. weak positive correlation
 2. moderate positive correlation
 3. calculation error that has been made
 4. strong correlation

Use the information below to answer questions 21 to 23.

X: 33 26 31 19

Y: 22 20 15 10

- (21) A notation ΣY^2 refers to _____.
1. $(67)^2$
 2. $22^2+20^2+15^2+10^2$
 3. $22+20+15+10$
 4. $(22+20+15+10)^2$
- (22) What is the ΣX ?
1. 110
 2. 218
 3. 109
 4. 3087

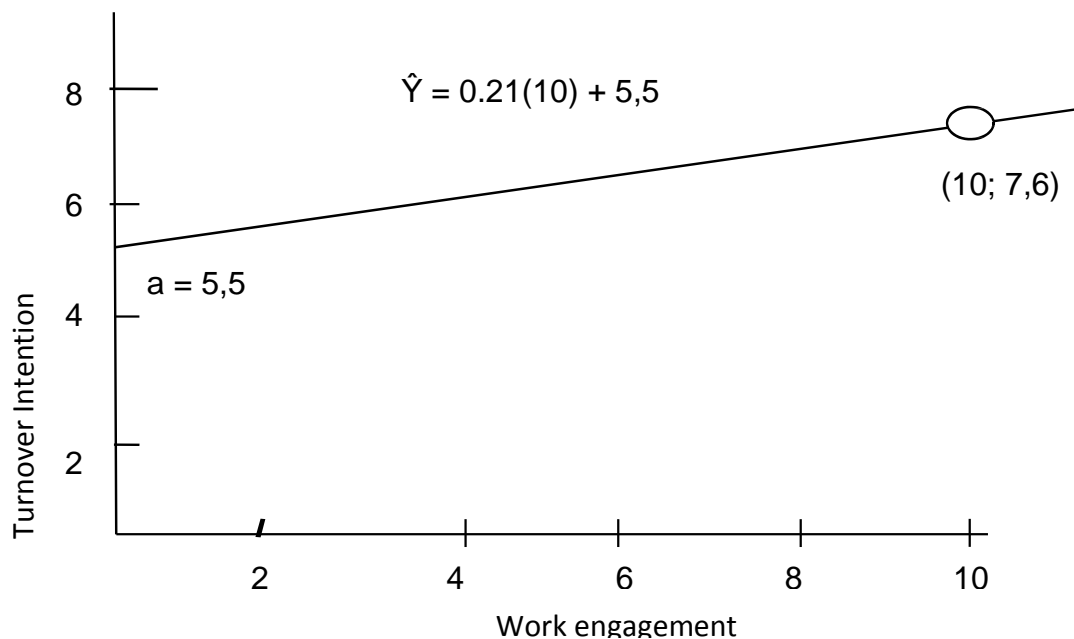
(23) What is the ΣXY ?

1. 1190
2. 1901
3. 176
4. 7303

(24) The Y-intercept is the point where the line intersects the Y-axis. Is this statement true or false?

1. True.
2. False.

Use the graph below to answer questions 25 to 28.



(25) The graph is incomplete because the Y intercept is not indicated. Is this statement true or false?

1. True.
2. False.

(26) The value of the slope is _____.

1. 10
2. 5,5
3. 0,21
4. 7,6

(27) The turnover intention is on the X-axis, while work engagement is on the Y-axis. Is this statement true or false?

1. True
2. False

- (28) What is the predicted value of X?
1. 10
 2. 5,5
 3. 0,21
 4. 7,6
- (29) If the standard deviation for the performance score of students is 5 and the mean is 15, what will the variance be?
1. Not enough information for a calculation.
 2. 10
 3. 75
 4. 25
- (30) The kurtosis of a distribution refers to the relative flatness or peakedness in the middle. Is this statement true or false?
1. True
 2. False

ASSIGNMENT 02

Closing date:	16 April 2018
Total:	50 marks
Study material:	Learning units 9 to 14
Unique number:	869757

This assignment deals with inferential statistics. Use computational formulas where applicable and round off the final answer to two decimals. (Values read from tables must be given unaltered.)

This assignment should be completed on the answer sheet (which is provided in the addendum of this tutorial letter and on myUnisa under Additional Resources).

It can be cut out of this tutorial letter and completed by hand. This answer sheet can then be submitted in an assignment cover.

OR

You can download it from myUnisa, complete it electronically and submit it electronically on myUnisa again.

PLEASE MAKE SURE THAT YOUR STUDENT NUMBER IS CLEARLY INDICATED ON THE ANSWER SHEET.

QUESTION 1

[7]

Julius and his friend Debby entered a lucky draw and can win R200 000 worth of prizes from a garden magazine. Julius sent through 60 entry forms, while Debby sent through 40. The report from the competition administrators is that 200 entries qualified, and both Julius and Debby qualified. Use this information to answer the following questions:

- 1.1 What is the probability that Julius will win first prize? (2)
- 1.2 If Julius wins first prize, what is the probability that Debby will win second prize? (The first prize-winning entry is not put back in the container.) (2)
- 1.3 What is the probability that Julius and Debby will win first and second prize? (3)

QUESTION 2

[6]

You have collected information from your fellow students on how valuable they found the module of IOP2601. This was done by asking five questions that had to be rated on a five-point scale. Given a normally distributed population with a mean (μ) of 20, a standard deviation (σ) of 8, and 35 as the number of cases (N), answer the following questions:

- 2.1 What is the **proportion** of students with a raw score of less than 18? (2)
- 2.2 What is the **percentage** of students with a raw score less than 25? (2)
- 2.3 What is the **number** of students with raw scores of between 18 and 25? (2)

QUESTION 3**[5]**

You want to investigate the following research question: Do students who have a positive attitude towards research perform better in their examination for IOP2601 in comparison to students who have a negative attitude towards research?

- 3.1 Formulate an appropriate null hypothesis and alternative hypothesis in words. (2)
- 3.2 Based on the results presented on the computer printout, would you reject the null hypothesis? (1)
- 3.3 Interpret your rejection or non-rejection of the null hypothesis in plain language, in terms of the original problem statement. With how much certainty can you conclude this? (2)

Group statistics

Students' attitudes		N	Mean	Std deviation	Std error mean
Exam	Positive	10	55.6000	13.81666	4.36921
	Negative	10	67.8000	14.88064	4.70567

Independent samples test

		Levene's test for equality of variances		t-test for equality of means						
		F	Sig	t	df	Sig (2-tailed)	Mean difference	Std error difference	95% confidence interval of the difference	
									Lower	Upper
Exam	Equal variances assumed	.966	.001	-7.144	18	.000	-24.200	1.132	-37.690	-10.701
	Equal variances not assumed			-7.144	17.902	.000	-24.200	1.132	-37.695	-10.704

QUESTION 4**[10]**

You are an industrial psychologist contracted by an insurance company that is planning to change its building structure to open-plan offices. Management wants to know if this change will affect employee motivation.

You identified two organisations and administered a motivation questionnaire to employees in both organisations. In Organisation A, where every employee has his or her own office, 12 employees completed the questionnaire. Similarly, in Organisation B, which uses open-plan offices, 12 employees completed the questionnaire. The data are as follows:

Motivation scores	
Organisation A	Organisation B
9	6
8	5
7	5
5	4
6	7
9	8
6	4
7	5
6	3
5	5
7	5
4	4

You want to determine if the employees of Organisation A (individual offices) have **significantly higher levels** of motivation than the employees of Organisation B (open plan offices).

You decide on a level of significance of $\alpha = 0,05$.

- 4.1 Formulate an appropriate null hypothesis (H_0) in words. (1)
- 4.2 Formulate an appropriate alternative hypothesis (H_1) in symbols. (1)
- 4.3 Assuming that your data are normally distributed, select an appropriate statistical test and calculate the test statistic. Show ALL calculations. (3)

	N	\bar{X}	s^2
Organisation A	12	6,58	2,45
Organisation B	12	5,08	1,90

- 4.4 Determine the degrees of freedom. (1)
- 4.5 Determine the critical value for a one-tailed test for a significance level of 5% (0,05). (1)
- 4.6 Interpret the results in terms of the rejection or non-rejection of the null hypothesis. (1)
- 4.7 Interpret your rejection or non-rejection of the null hypothesis in plain language, in terms of the original problem statement. With how much certainty can you conclude this? (2)

QUESTION 5**[12]**

You and your friends wish to obtain good marks in IOP2601, and have read from an article that eating dark chocolate while studying can stimulate your brain and make you smarter. You now want to know if a student's performance can improve with the number of dark chocolate bars they eat during their study time. You randomly selected a total of 15 students registered for IOP2601. Their performance scores are presented as follows:

Performance scores		
One bar takers	Two bar takers	Three bar takers
2	3	4
2	5	5
4	5	6
3	6	4
2	4	2

You want to answer the following question: Is there a significant difference in the performance of students who eat one, two, and three bars of dark chocolate while studying? Or, stated differently, you test the following null hypothesis:

$$H_0: \mu_{1bar} = \mu_{2bars} = \mu_{3bars} \text{ with } \alpha = 0,05$$

- 5.1 Choose an appropriate test statistic to test this hypothesis and calculate the test statistic. Present your answers in a summary table. (8)
- 5.2 Determine the critical value that will help you to decide whether or not you should reject the null hypothesis at a **significance level of 5% (0,05)**. (1)
- 5.3 Do you reject the null hypothesis? (1)
- 5.4 Interpret your findings in terms of the original problem statement. With how much certainty can you conclude this? (2)

QUESTION 6**[3]**

Psychological safety has been shown to have an effect on organisational outcomes such as lower levels of absenteeism, higher levels of work engagement, and increased performance. Some research suggests that the experience of psychological safety might be related to the age of employees. Management asks you to conduct a study to determine if these research results are also true for your organisation. In your study, you decide to test the experience of psychological safety among employees between the ages of 20 and 29, between the ages of 30 and 39, and between the ages of 40 and 49. View the computer printout below with the results from SPSS and answer the questions that follow.

ANOVA

Psychological safety

	Sum of squares	df	Mean square	F	Sig
Between groups	35.10	2	17.55	36.787	.125
Within groups	24.400	12	2.033		
Total	133.333	14			

- 6.1 Do you reject the null hypothesis? (1)
- 6.2 Write your conclusion to management in terms of the original problem statement. With how much certainty can you conclude this? (2)

QUESTION 7

[7]

A recent trend in industrial and organisational psychology shows that more females than males are entering into post-graduate studies in this field of study. As an emerging psychologist, you decide to investigate if this trend is already apparent at undergraduate level (first, second and third-year level).

The table below presents the data you have collected:

	Males (A)	Females (B)
First-year level	15	25
Second-year level	12	18
Third-year level	5	12

The chi-square value is 0,58.

- 7.1 Make a contingency table to represent the given information. Clearly indicate the observed (*O*) and expected (*E*) values. (3)
- 7.2 Determine the critical value for a significance level of 5% (0,05). (1)
- 7.3 Do you reject the null hypothesis? (1)
- 7.4 Interpret your rejection or non-rejection of the null hypothesis in plain language, in terms of the original problem statement. With how much certainty can you conclude this? (2)

ASSIGNMENT 03**Self-assessment****Study material: Learning unit 16**

We have used learning unit 16 as Assignment 03. It is a revision of descriptive and inferential statistics. Work through it and compare your answers with those given in the study guide.

SEMESTER 2

JULY TO NOVEMBER

ASSIGNMENT 01

Closing date:	3 September 2018
Total:	30 marks
Study material:	Learning units 1 to 8
Unique number:	764289

This compulsory assignment consists of multiple-choice questions that should be completed on a **mark-reading sheet** (which you received with your study material) and must then be submitted to the university. Please refer to the *Study @ Unisa* brochure on how to complete the mark-reading sheet.

QUESTIONS (1) TO (30): MULTIPLE-CHOICE QUESTIONS [30]

- (1) Assignments cannot be sent directly to the lecturers; however, the students can use the e-mail Deptiop@unisa.ac.za to send their late assignments. Is this statement true or false?
1. True.
 2. False.
- (2) The year mark is very important – it counts 20% towards the final mark; however, students still need to obtain a minimum of 40% in the examination. Is this statement true or false?
1. True.
 2. False.
- (3) Assignments 01 and 02 can be submitted by post or through myUnisa. Is this statement true or false?
1. True.
 2. False.
- (4) There are typical steps that researchers use when conducting research. The sequence of the research process is based on a five-step procedure, which is as follows:
1. Design the study; collect the data; identify the problem; analyse the data; and draw conclusions.
 2. Identify the design of the study; clarify the problem; and collect and analyse the data.
 3. Identify the problem; design the study; collect the data; analyse the data; and draw conclusions.
 4. Identify the problem; collect the data; design the study; analyse the data; and draw conclusions.

- (5) The score distribution of an easy test will be negatively skewed. Is this statement true or false?
1. True.
 2. False.

Use the table below to answer questions 6 to 10.

Class interval	Frequency	Cumulative frequency	% Frequency	Cumulative % frequency
70 - 74	7	110	6	100
65 - 69	11	103	10	94
60 - 64	23	92	21	84
55 - 59	25	69	23	63
50 - 54	30	44	27	40
45 - 49	14	14	13	13

- (6) The class interval width for this distribution is _____.
1. 5
 2. 6
 3. 4
 4. 11
- (7) When determining the percentile rank of a score of 68, the percentage (%) below you will substitute for the formula is _____.
1. 94
 2. 84
 3. 63
 4. 10
- (8) When determining the percentile rank of a score of 68, the interval percentage (%) you will substitute for the formula is _____.
1. 10
 2. 94
 3. 21
 4. 84
- (9) What is the score at which 55% of all the employees scored?
1. 78,75
 2. 8,75
 3. 57,76
 4. 7,5

(10) What is the total of the scores in the distribution?

1. Not enough information is provided.
2. 74
3. 100
4. 110

Use the information below to answer questions 11 to 15.

X: 7 9 8 7 6 8 1 6 9 8

Y: 1 2 2 3 1 2 4 5 4 5

(11) What is the mean of X (\bar{X})?

1. 7,5
2. 14
3. 69
4. 6,9

(12) The mode of the Y distribution is _____.

1. 1,5
2. 29
3. 2
4. 2,9

(13) What is the median for the X-scores?

1. 6,5
2. 7
3. 29
4. 8

(14) The mode of the Y distribution is _____.

1. 5,4
2. 4,3
3. 4
4. 5

(15) What is the standard deviation of the Y-scores?

1. 4,3
2. 1,5
3. 5,5
4. 5,4

Use the information below to answer questions 16 to 19.

Students were asked to indicate to which degree they find statistics interesting, to which degree they find it difficult, and how much effort they are willing to put into their studies. The results of a computed Pearson correlation are presented below. Use it to answer the question that follows:

	Interesting	Difficulty	Effort
Interesting Pearson correlation	1	0.70*	-0.45**
Sig (2-tailed)		0.05	0.01
N	208	208	208
Difficulty Pearson correlation	0.70*	1	-0.34**
Sig (2-tailed)	0.05		0.01
N	208	208	208
Effort Pearson correlation	-0.45**	-0.34**	1
Sig (2-tailed)	0.01	0.01	
N	208	208	208

*The correlation is significant at the 0,05 level (2-tailed)

**The correlation is significant at the 0,01 level (2-tailed)

- (16) Is there a significant correlation between the amount of effort students are willing to invest and the degree to which they find statistics difficult?
1. Yes.
 2. No.
- (17) Which of the correlation coefficients presented in the table above is statistically significant?
1. Effort and interesting.
 2. Effort and difficulty.
 3. Interesting and difficulty.
 4. All variables are significantly related.
- (18) How many students participated in this study?
1. 646.
 2. 208.
 3. 69.
 4. 3.
- (19) The table shows that a significantly negative relationship between difficulty and effort was found. Is this statement true or false?
1. True.
 2. False.

- (20) In the regression equation, “ b ” represents the _____.
1. predicted value
 2. predictor variable
 3. slope of the line
 4. Y intercept
- (21) The most important difference between correlation and regression is that the latter is _____.
1. used to investigate the relationship between variables
 2. used only to compare groups among themselves
 3. can be computed for only two variables
 4. used to make predictions
- (22) A correlation of 0,85 represents a _____.
1. weak positive relationship
 2. moderate positive relationship
 3. calculation error that has been made
 4. strong positive relationship
- (23) The Y intercept is the point where the regression line intersects the X-axis. Is this statement true or false?
1. True.
 2. False.
- (24) On the X-axis, all Y-values are equal to _____.
1. 1
 2. 50
 3. 0
 4. 100
- (25) In the regression equation, if $\hat{Y} = 0,55X + 8,06$, the Y-intercept is equal to _____.
1. 0,55
 2. 8,06
 3. 0,55X
 4. 0,07
- (26) A correlation coefficient of zero means that _____.
1. there is a weak relationship between the variables being measured
 2. a moderate relationship between the variables being measured exists
 3. there is a very strong relationship between the variables being measured
 4. there is no relationship between the variables being measured

- (27) Which of the following is not a measure of variability covered in this module?
1. Range.
 2. Variable.
 3. Variance.
 4. Standard deviation.
- (28) The percentage of a common variance of a correlation of 0,49 is _____%.
1. 4,9
 2. 70
 3. 49
 4. 24,01
- (29) If the variance for the performance score of students is 12,5 and the mean is 32,5, what will the standard deviation be?
1. Not enough information provided for this calculation.
 2. 0,38
 3. 3,54
 4. 2,6
- (30) The smaller the variance, the closer the individual scores are to the mean. Is this statement true or false?
1. True.
 2. False.

ASSIGNMENT 02

Closing date:	1 October 2018
Total:	50 marks
Study material:	Learning units 9 to 14
Unique number:	679079

This assignment deals with inferential statistics. Use computational formulas where applicable and round off the final answer to two decimals. (**Values read from tables must be given unaltered.**)

This assignment should be completed on the answer sheet (which is provided in the addendum of this tutorial letter and on myUnisa under Additional Resources).

It can be cut out of this tutorial letter and completed by hand. This answer sheet can then be submitted in an assignment cover.

OR

You can download it from myUnisa, complete it electronically, and submit it electronically on myUnisa again.

PLEASE MAKE SURE THAT YOUR STUDENT NUMBER IS CLEARLY INDICATED ON THE ANSWER SHEET.

QUESTION 1

[7]

Bongo and his favourite cousin, Vuyi, entered a lucky draw where they can win R150 000 worth of prizes from a local newspaper. Bongo sent through 20 entry forms, while Vuyi sent through 15. The report from the competition administrators is that 50 entries qualified, and both Bongo and Vuyi qualified. Use this information to answer the following questions:

- 1.1 What is the probability that Bongo will win first prize? (2)
- 1.2 If Bongo wins first prize, what is the probability that Vuyi will win second prize? (The first prize-winning entry is not put back in the container.) (2)
- 1.3 What is the probability that Bongo and Vuyi will win first and second prize? (3)

QUESTION 2

[6]

You have collected information from your fellow students on how valuable they found the module of IOP2601. This was done by asking five questions that had to be rated on a five-point scale.

Given a normally distributed population with a mean (μ) of 18, a standard deviation (σ) of 9, and 45 as the number of cases (N), answer the following questions:

- 2.1 What is the **proportion** of students with a raw score of less than 10? (2)
- 2.2 What is the **percentage** of students with a raw score of greater than 20? (2)
- 2.3 What is the **number** of students with raw scores between of 10 and 20? (2)

QUESTION 3

[5]

Your organisation is considering investing in coaching as a means to develop people. Your manager asks you the following question: Are employees who are involved in a coaching programme more likely to stay with the organisation than those employees who are not involved in a coaching programme?

- 3.1 Formulate an appropriate null hypothesis and alternative hypothesis in words. (2)
- 3.2 Based on the results presented on the computer printout, would you reject the null hypothesis? (1)
- 3.3 Interpret your rejection or non-rejection of the null hypothesis in plain language, in terms of the original problem statement. With how much certainty can you conclude this? (2)

Group statistics

Students' attitudes		N	Mean	Std deviation	Std error mean
Exam	Positive	72	45.7000	11.11366	4.36921
	Negative	72	69.9000	11.83104	4.70567

Independent samples test

		Levene's test for equality of variances		t-test for equality of means						
		F	Sig	t	df	Sig (2-tailed)	Mean difference	Std error difference	95% confidence interval of the difference	
									Lower	Upper
Exam	Equal variances assumed	.999	.000	-3.769	18	.001	-24.200	6.42132	--37.690	-10.701
	Equal variances not assumed			-3.769	17.902	.001	-24.200	6.42132	-37.695	-10.704

QUESTION 4**[10]**

The IOP2601 lecturers are interested to know if students' attitudes towards statistics are different at the end of the course in comparison with their attitudes towards statistics before the course. They randomly select a group of 10 students from the class and present them with a questionnaire to assess their attitude toward statistics before they start with the course. They again ask the **same group** of students to complete the questionnaire at the end of the course. The following scores are obtained:

Group A	Group B
3	5
4	6
5	7
3	5
7	6
6	4
5	8
2	9
4	8
7	9

The lecturers asked you to help with the data analysis and to determine if the students' attitudes towards statistics after the course are more positive in comparison to their attitudes before the course.

You decide on a level of significance of $\alpha = 0,01$.

- 4.1 Formulate an appropriate null hypothesis (H_0) in symbols. (1)
- 4.2 Formulate an appropriate alternative hypothesis (H_1) in symbols. (1)
- 4.3 Assuming that your data are normally distributed, select an appropriate statistical test and calculate the test statistic. Show ALL calculations. (3)

$\bar{D} = 2,1$	$s_x = 6.1$
-----------------	-------------

- 4.4 Determine the degrees of freedom. (1)
- 4.5 Determine the critical value for a two-tailed test for a significance level of 1% (0,01). (1)
- 4.6 Interpret the results in terms of the rejection or non-rejection of the null hypothesis. (1)
- 4.7 Interpret your rejection or non-rejection of the null hypothesis in plain language, in terms of the original problem statement. With how much certainty can you conclude this? (2)

QUESTION 5**[12]**

IOP2601 staff are interested to know if the performance of their students is influenced by their geographic location. They randomly selected a total of 15 students registered for IOP2601 from three provinces. Their performance scores are presented as follows:

PERFORMANCE SCORES		
GAUTENG (1)	LIMPOPO (2)	MPUMALANGA (3)
5	4	3
5	4	7
2	2	6
3	10	4
5	5	10

Research question: Is there a significant difference between the three groups regarding their productivity? OR, stated differently, test the following null hypothesis:

$$H_0: \mu_1 = \mu_2 = \mu_3 \text{ with } \alpha = 0,01$$

- 5.1 Choose an appropriate test statistic to test this hypothesis and calculate the test statistic. Present your answer in a summary table. (8)
- 5.2 Determine the critical value that will help you to decide whether or not you should reject the null hypotheses at a **significant level of 1% (0,01)**. (1)
- 5.3 Do you reject the null hypothesis? (1)
- 5.4 Interpret your findings in terms of the original problem statement. With how much certainty can you conclude this? (2)

QUESTION 6**[3]**

A multinational petrochemical organisation is concerned with the high levels of absenteeism among its plants in Australia, South Africa and England. You are presented with a SPSS output with regard to the results of the study to interpret for senior management.

ANOVA

Absenteeism					
	Sum of squares	df	Mean square	F	Sig
Between groups	4.133	2	2.067	.422	.001
Within groups	58.800	12	4.900		
Total	62.933	14			

- 6.1 Do you reject the null hypothesis? (1)
- 6.2 Write your conclusion in terms of the original problem statement. With how much certainty can you conclude this? (2)

QUESTION 7**[7]**

A recent trend in most distance learning institutions is the increase of the use of online modules in tuition. As a young academic for a Research Methodology module, you decide to investigate if students at undergraduate level (first, second and third-year level) in your department would accept the introduction of online tuition for the module differently.

In the table below, you will see the responses of the three groups to the following question: Do you want the Research Methodology module to be offered as an online module?

- A Yes
B No

The data is as follows:

	A	B
First-year level	45	10
Second-year level	40	10
Third-year level	30	5

The chi-square value is 0,26.

- 7.1 Make a contingency table to represent the given information. Clearly indicate the observed (*O*) and expected (*E*) values. (3)
- 7.2 The critical value for a significance level of 5% (0,05) is. Do you reject the null hypothesis? (1)
- 7.3 Interpret your rejection or non-rejection of the null hypothesis in plain language, in terms of the original problem statement. With how much certainty can you conclude this? (2)

ASSIGNMENT 03

Self-assessment

Study material: Learning unit 16

We have used learning unit 16 as Assignment 03. It is a revision of descriptive and inferential statistics. Work through it and compare your answers with those given in the study guide.

Appendix B: Answer sheet for Assignment 02

IOP2601 2018
ANSWER SHEET FOR ASSIGNMENT 02

STUDENT NUMBER _____

	ANSWER	MARKS
	QUESTION 1	___/7
1.1		___/2
1.2		___/2
1.3		___/3
	QUESTION 2	___/6
2.1		___/2
2.2		___/2
2.3		___/2



	ANSWER	MARKS
	QUESTION 3	___/5
3.1		___/2
3.2		___/2
3.3		___/1
	QUESTION 4	___/10
4.1		___/1
4.2		___/1
4.3		___/3
4.4		___/1
4.5		___/1



ANSWER						MARKS
4.6						___/1
4.7						___/2
QUESTION 5						___/12
5.1						___/8
	<i>Source</i>	<i>df</i>	<i>SS</i>	<i>MS</i>	<i>F</i>	
	Groups					
	Error					
	Total					
5.2						___/1
5.3						___/1
5.4						___/2
QUESTION 6						___/3
6.1						___/1
6.2						___/2



		ANSWER			MARKS
		QUESTION 7			<u> </u> /7
7.1		A	B	TOTAL	<u> </u> /3
	1 st -year level				
	2 nd -year level				
	3 rd -year level				
	TOTAL				
7.2				<u> </u> /1	
7.3				<u> </u> /1	
7.4				<u> </u> /2	