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STAT 2420SED

Statistics in Society

Course Guide



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Welcome to STAT 2420SED

Welcome to *STAT 2420SED Statistics in Society*!

This *Course Guide* contains essential information about the content and components of the course that you will need to know before you start your study.

Your study will change the way in which you look at many of the things in your day-to-day life. Many types of information are now quantified; for most of us, hardly a day goes by without reading a news item that involves numbers or statistics. However, there is more to these news items than just the numbers quoted. In order to understand what is happening around you, you need to know what the numbers mean, where they came from, and how they should be interpreted — and there are other factors you need to consider as well.

This is what statistics is all about. After working through this course, you should be better able to understand and interpret such information. You should also know how to relate that information to your own experience, and to other aspects of everyday life.

Introduction to the course

STAT 2420SED is a 6-credit-unit, 2000-level course.

The course teaches the elementary statistical analysis techniques that can be used to investigate a variety of applications of statistics in everyday life. The course emphasises the use of statistical ideas for making decisions, and engaging in exploratory data analysis and basic statistical inference. Working with preset Excel worksheets and data sets will provide you with practical training for data analysis, and for meeting everyday life requirements.

This course is a distance learning course that will be delivered in a print-based, custom textbook format, supplemented with a *Study Guide*, plus online course components and face-to-face sessions. There are a total of seven units that are adapted from a textbook on introductory statistics. These selected chapters are specifically designed for the use of *STAT 2420SED* students; they will contain a full range of statistical analysis methods and graphical capabilities, along with some built-up Excel worksheets. Computerised statistical analysis using XLSTAT will also be introduced during the tutorials.

Course aims

The overall aims of *STAT 2420SED Statistics in Society* are to:

- *introduce* the general concepts of data production, data analysis and statistical inference to draw conclusions about the important parameters of the underlying population;
- *provide* a simple, yet critical, introduction to exploratory data analysis and statistical reasoning;
- *introduce* a wide diversity of applications of statistics in everyday-life problems; and
- *explore* the use of computing technology to perform statistical data analysis.

Course learning outcomes

Upon the completion of *STAT 2420SED Statistics in Society*, you should be able to:

- *present, visualise, and graphically display* basic statistical relationships for a given data set;
- *explain* the basic concept of probability, and *outline* its applications;
- *determine* sampling error and sampling distribution;
- *use* parametric statistical tests to *perform* hypothesis testing in scientific research;
- *use* non-parametric statistical tests to *perform* hypothesis testing for decision-making in daily-life problems;
- *explore* the relationship between categorical variables using chi-square procedures, and *apply* this to daily-life problems; and
- *explore* the relationship between two quantitative variables using linear regression analysis, and *apply* this for scientific estimation and prediction.

What to do before the course begins

STAT 2420SED has no required courses as prerequisites. The course material has also been written for students with very little mathematical experience. We assume that you can do some arithmetic (with the help of a calculator), and that you understand simple tables and graphs. Don't worry, however, if you find that prospect a little alarming, because there should be plenty of time for you to get a bit of practice and gain confidence.

Course Guide

The first thing to do is to read this *Course Guide*. This guide contains important information about the course structure and the assessment strategy.

Course schedule

The course schedule is available on the *STAT 2420SED* Online Learning Environment (OLE). This timetable is designed to give general guidelines on how you can complete your study, and to tell you the assignment due dates and the schedule for face-to-face sessions.

Calculator

You will need a calculator for this course. You will need to know how to use your calculator right at the beginning of the course, so you should spend some time getting used to it before the course begins. Even if you have owned one for some time, you may still find it useful to get some more practice.

You will be allowed to bring a calculator into the examination room, but only HKMU-approved models. A list of approved calculator models can be found on the *STAT 2420SED* OLE.

Home computer

It is essential that you have access to a home PC with an Internet connection for this course.

Most units in this course have a section based on using statistical software in the **Technology Centres** that appear throughout the textbook. Spreadsheets and step-by-step procedures for conducting statistical and data analysis are provided in these Technology Centres. They will require the use of **Microsoft Excel** spreadsheets.

For working with these Excel spreadsheets, you will need to install an Excel add-in statistics software package called **XLSTAT** on your computer. This version of XLSTAT is specifically built for Pearson statistical analysis with an add-in tool. It offers a wide variety of functions to enhance the analytical capabilities of Microsoft Excel®. XLSTAT is compatible with all Excel versions (except 2008 for Mac).

XLSTAT installation procedure can be found on pages 11–15 of this *Course Guide*.

Your home computer should therefore be installed with Microsoft Windows (Windows 7 or above) and Microsoft Excel.

Working through this course

In this course's custom textbook-based approach, the course's learning modules comprise a total of twelve chapters from a leading statistics textbook.

Your study pathway through the custom textbook is set out in an HKMU-produced *Study Guide*. In addition to the guided activities and self-tests already provided in the custom textbook, the *Study Guide* includes supplementary material and additional self-assessment opportunities.

The third main place you will refer to for learning resources during the course is the OLE. There, you will have access to a rich array of multimedia materials such as lecture PPT slides and class recordings, and you will be able to discuss topics with other students and your tutor on the course discussion board.

This course is further supported by regular face-to-face meetings in the form of lectures and tutorials.

This course's combination of the latest editions of textbooks, plus the *Study Guide*, and multimedia and face-to-face learning opportunities, will provide you with a rich coverage of the use of statistics in society.

Summary of units

The course consists of seven units. The title and a short description of each unit is given below.

- *Unit 1 Data analysis and descriptive statistics* introduces the idea of statistical data and begins to look at ways of collecting, organising and summarising statistical data using graphical presentations and analysis through your Excel add-in software XLSTAT.
- *Unit 2 Measuring chance and probability* introduces another aspect of inferential statistics called probability theory. This unit begins with some simple probability concepts. Probabilities enable you to evaluate the uncertainties that our conclusions draw from an entire population. More generally, probability theory provides the mathematical basis for inferential statistics.

- *Unit 3 Sampling distribution of the sample mean and confidence intervals* discusses the most important distribution in statistics, called the normal distribution. You will work with normally distributed variables and assess normal probability plots. This unit's coverage extends to the concepts of sampling error and sampling distribution of sample means. You will develop important statistical-inference procedures to examine the sample mean from a population to estimate and to draw conclusions about the entire population.
- *Unit 4 Hypothesis tests for one population mean* and *Unit 5 Hypothesis tests for two population means* introduce you to statistical inferences. These units have two basic themes: one is concerned with the processes involved in collecting and using data from scientific research and experiments; the other involves the use and interpretation of statistics both by an individual and by society in general. The hypothesis tests for one and two populations will be discussed.

You will learn how to apply the critical value and P -value approaches to hypothesis testing. In these two units, both parametric and nonparametric methods will be examined.

- *Unit 6 Categorical data analysis* deals with inferential statistics that are not concerned with population parameters. Instead, it will focus on the chi-square distribution. You will learn the chi-square procedures and use hypothesis tests to decide whether a categorical variable is likely to come from a specified distribution, whether an association exists between two categorical variables of a population, and whether a difference exists among two or more population proportions.
- *Unit 7 Relationships and regression analysis* examines the linear relationships between two or more quantitative variables. Linear regression and correlation coefficients are introduced to examine relationships between two quantitative variables. In this unit, both descriptive and inferential methods in linear regression and correlation will be examined.

(An outline of the contents of each unit can be found in **Appendix A** of this *Course Guide*.)

Custom textbook

A custom textbook (e-book) will be provided to you as an integral part of the course. The title of the custom textbook is *STAT 2420SED Statistics in Society*. The custom textbook comprises seven units, which are adapted from the following textbook:

- Weiss, N A (2017) *Introductory Statistics*, 10th edn, Global edn, Essex: Pearson.

The *Study Guide* will indicate at which points you should read each chapter and do exercises provided in the custom textbook.

You can access the custom textbook (e-book) online by visiting the VitalSource Bookshelf's website. An access code and the registration procedures will be provided to you electronically through the University's email system at the beginning of the course.

Study Guide

The *Study Guide* sets out your study pathway through the custom textbook and other course learning resources. It serves as a guide to the textbook chapters. It also contains activities and self-tests to facilitate your learning. You will therefore need to keep it by your side as you work through the course.

The *Study Guide* is divided into seven units. The titles of the units and the custom textbook chapters they will cover are set out in the following table.

Unit		Custom textbook chapters
1	Data analysis and descriptive statistics	Ch. 1: The nature of statistics Ch. 2: Organising data Ch. 3: Descriptive measures
2	Measuring chance and probability	Ch. 4: Probability concepts
3	Sampling distribution of the sample mean and confidence intervals	Ch. 6: The normal distribution Ch. 7: The sampling distribution of the sample mean Ch. 8: Confidence intervals for one population mean
4	Hypothesis tests for one population mean	Ch. 9: Hypothesis tests for one population mean
5	Hypothesis tests for two population means	Ch. 10: Inferences for two population means
6	Categorical data analysis	Ch. 13: Chi-square procedures
7	Relationships and regression analysis	Ch. 14: Descriptive methods in regression and correlation Ch. 15: Inferential methods in regression and correlation

Online Learning Environment (OLE)

A dedicated area for *STAT 2420SED* students has been set up in HKMU's OLE. You will need to log on regularly to the OLE to access the course discussion board and online supplementary learning components.

Assignment submission and extension

This presentation of *STAT 2420SED* OLE includes the following three sub-components related to your assignments:

1. Assignment File — all assignment questions will be posted on the OLE.
2. Assignment submission and extension. This component allows you to:
 - check the status of your assignments;
 - submit your assignments;
 - check your assignment scores; and
 - apply for extensions for late submission.

3. Assignment submission (multiple-choice) — answers to the multiple-choice assignment **must be submitted** through the Assignment (MC) submission system. No postal mailing is accepted.

Interactive tools

One of the interactive tools available on the OLE is the course discussion board. The discussion board allows you to post any problems that you would like to discuss with other students and your tutor. In addition, you can make use of the University's email system; you can gain access to it through the OLE. Using it, you can send email to fellow students, your tutor and the Course Coordinator, and receive email from them.

Face-to-face support via lectures and tutorials

You will be supported throughout the course by regular face-to-face meetings in the form of supplementary lectures and tutorials.

There are seven supplementary lectures and seven tutorials provided for this course. All lectures and tutorials will be two-hour sessions and will be conducted by your assigned tutor.

You should refer to the course schedules for details on lecture and tutorial arrangements. Although the lectures and tutorials are not compulsory, you are strongly advised to attend them.

Unit	Face-to-face sessions	Hours
1	Supplementary lecture 1 (2 hours) Tutorial 1 (2 hours)	4
2	Supplementary lecture 2 (2 hours) Tutorial 2 (2 hours)	4
3	Supplementary lecture 3 (2 hours) Tutorial 3 (2 hours)	4
4	Supplementary lecture 4 (2 hours) Tutorial 4 (2 hours)	4
5	Supplementary lecture 5 (2 hours) Tutorial 5 (2 hours)	4
6	Supplementary lecture 6 (2 hours) Tutorial 6 (2 hours)	4
7	Supplementary lecture 7 (2 hours) Tutorial 7 (2 hours)	4
Total		28

Online lecture PPT slides

Each unit will be supported by a supplementary lecture. All lecture PPT slides will be available on the OLE for you to study after each session.

Unit	Online resources	Hours
1	Lecture 1 PPT slides	1.5
2	Lecture 2 PPT slides	1.5
3	Lecture 3 PPT slides	1.5
4	Lecture 4 PPT slides	1.5
5	Lecture 5 PPT slides	1.5
6	Lecture 6 PPT slides	1.5
7	Lecture 7 PPT slides	1.5
Total		10.5

Assessment

You are expected to apply concepts and techniques acquired during the study when completing this course's continuous assessment. You will also undertake regular activities and practical exercises while working through the study units.

The course contains continuous assessment and a final examination. Their respective weightings are 30% and 70% of the course score. Continuous assessment consists of four assignments, of which one of them is a multiple-choice assignment. The minimum passing threshold for both continuous assessment and the examination is 40 marks out of 100 marks. In order to pass the course, you need to meet both thresholds.

Assignment booklets

The assignment booklets contain more information about which units are covered by each assignment, and when you should submit your assignments. The assignment booklets will be posted on the OLE for you to download.

Computer Marked Assignment (CMA)

There is one multiple-choice assignment in this course, and this contains 20 to 30 multiple-choice questions. This assignment assesses fundamental concepts related to statistical methods and data-handling skills. This multiple-choice assignment is required to be submitted through the online Assignment (MC) submission system.

Tutor Marked Assignments (TMAs)

There are three tutor marked assignments for the course. Upon receiving your assignments, your tutor will mark them and return them to you with your scores, comments, and feedback.

Examination

The purpose of the examination is to assess your understanding of the material covered in the entire course. The three-hour final examination will be ‘closed book’, with the exception of the Course Formula Booklet and Statistical Tables. The examination is worth 70% of the total course mark. The exam paper will be divided into two parts:

- Part I will contain some short questions that assess your general knowledge of the course material from all units.
- Part II will comprise more challenging long questions based on a problem-solving approach. The questions will assess your skills in statistical analysis and using methods of inferential statistics for the analysis of real-life problems, and in concluding results for recommendation.

Specimen examination

To help you prepare for the final examination, you will be sent a specimen examination paper some time before the actual examination. You should work through this carefully, together with the sample solutions that will be provided.

Assessment summary

The assessment items and their respective weightings are outlined in the following table.

	Type and coverage	Weighting
Continuous assessment (30%)	Assignment 1: CMA 01 20–30 multiple-choice questions covering <i>Unit 1</i>	25%
	Assignment 2: TMA 01 3–4 independent problem-solving questions covering <i>Unit 2</i> and <i>Unit 3</i>	25%
	Assignment 3: TMA 02 3–4 independent problem-solving questions covering <i>Unit 4</i> and <i>Unit 5</i>	25%
	Assignment 4: TMA 03 3–4 independent problem-solving questions covering <i>Unit 6</i> and <i>Unit 7</i>	25%
Exam (70%)	A 3-hour examination covering the whole course	100%

Course overview

The following table gives a general overview of the course structure. It suggests the amount of time you should allow for completing units and provides a broad schedule for you to plan your work. This estimation includes time for reading the units and custom textbook, completing activities, self-tests and assignments, attending tutorials, and preparing for your final examination.

Unit	Weeks	Assessment
Unit 1 Data analysis and descriptive statistics	3	Assignment 1 (CMA 01)
Unit 2 Measuring chance and probability	2	Assignment 2 (TMA 01)
Unit 3 Sampling distribution of the sample mean and confidence intervals	2	
Unit 4 Hypothesis tests for one population mean	3	Assignment 3 (TMA 02)
Unit 5 Hypothesis tests for two population means	3	
Unit 6 Categorical data analysis	2	Assignment 4 (TMA 03)
Unit 7 Relationships and regression analysis	3	

Each study unit is designed to occupy you for two to three weeks. In general, we expect you to spend about 30 hours of work on a unit spanning a period of two to three weeks. Of course, you will probably find that some sections take you longer, while others require less time.

Using the units

We are sure that you will learn about statistics only by actively working on statistical problems. It is important that you do not simply sit in an armchair and read through the units. You must always work with pen, paper, calculator, and an alert mind. To help you with this, the following features are provided in the textbook.

- **Examples:** Examples illustrate points in the text or demonstrate how you should approach a particular type of problem. Follow these through carefully, checking the calculations for yourself and making sure you understand how they are arrived at for each stage.
- **Exercises:** At the end of each section of the unit, a set of exercises is designed to give you practice in various techniques. You can work through them as you come to them, or later use them as part of your revision.
- **Technology Centre:** This course includes computing activities using XLSTAT so you can practise using Excel with the add-in tool to consolidate your work on data analysis.
- **Review problems:** You will find additional groups of exercises called review problems at the end of each module/chapter. These provide extra practice if you need it and may be a little more demanding than the majority of the exercises within sections. You may regard these end-of-section exercises as optional; but at the risk of being repetitious, we recommend that you do as many of them as you can find the time for doing them.
- **Focusing on Data Analysis:** The Focusing on Data Analysis feature gives you the chance to work with large data sets, practise using XLSTAT, and discover the methods of exploring and analysing large data set problems.
- **Case study:** A Case Study Discussion is provided at the end of each module/chapter in which an opening case study is reviewed and discussed in light of the focus points, and then problems are presented for you to consider.

Other online supplementary materials

This course contains other materials such as stop presses, errata, the course schedules, and Excel data sets; all are available on the *STAT 2420SED* Online Learning Environment (OLE).

STAT 2420SED formula booklet and statistical tables

You may find this booklet useful as a source of reference while studying the course. The booklet contains two sections:

- a glossary of short definitions and formula of technical words used in the course; and
- a list of statistical tables.

You will **not be allowed** to bring this booklet to the exam. An identical copy of this booklet will be provided to you together with the exam paper.

Course schedules

The course schedule, which provides you with a timetable of important course activities and events, is available on the OLE. The organisation of the calendar is meant to give you an indication of how you should arrange your study of the course. Remember that you must aim to submit your assignments by the indicated due dates.

Stop presses

Throughout the presentation your Course Coordinator will send you stop presses that contain important up-to-date information about various aspects of the course. You should read each of these as soon as you receive it. All stop presses will be posted on the *STAT 2420SED* OLE.

Errata

Any course errata will contain corrections to the study material and assignment questions. You should check and amend your text immediately as soon as you receive an erratum. All errata will be posted on the *STAT 2420SED* OLE.

Data sets

More than 1,000 data sets in the examples and exercises of the textbook are installed in electronic files in several formats in the Data Sets of the WeissStats site.

Since this course uses Excel worksheet, for your convenience, all data sets in Excel format are available on the *STAT 2420SED* OLE.

To find these data sets, go to:

STAT 2420SED OLE → *Course Materials* → *XLSTAT Installation and Data Set*

Suggested solutions to self-tests

Suggested solutions to all of the self-test exercises are available on the *STAT 2420SED* OLE. You can check your solution after working out the exercises.

XLSTAT installation procedure

Installing **XLSTAT** (Excel add-in) onto your computer is easy! An access code is packaged with your textbook, which will be distributed to you electronically through the University's email system.

If you are not familiar with Microsoft Excel, a '**Getting Started with Excel**' user guide is available on the *STAT 2420SED* OLE, which provides basic information required for using Excel in this course.

To download the user guide, go to:
STAT 2420SED OLE → *Course Materials* → *XLSTAT Installation and Data Set*

Please follow the following two parts of instructions. Please do **not** have any Microsoft Excel spreadsheets open during the installation. As there may be frequent updates on the installation procedures, you are advised to follow the onscreen instructions of the latest software version provided to you.

Installation procedure

Part 1: Getting a license key

1. To use XLSTAT, you must first register online. You will need:
 - a valid email address; and
 - a unique student access code that has been emailed to you.
(Note: the student access code can be used only once.)
2. To **register online**, go to <https://www.pearson.com/us/higher-education/xlstat/index.html> and follow the onscreen instructions.
3. Enter the **access code** provided to you.
4. Enter your **email address**.

The screen that appears should look like the following:

5. Click the **Register Now** button.
6. A **license key** will be sent to your email address.

- Go to your email inbox to get the license key.

Reminder: Remember to write down and/or copy your license key electronically before downloading the XLSTAT software. An example of a license key is:
[D47A84-F4DBCA-4851B8-F52E1C-17084D-B59F3K.](#)

Part 2: Downloading the XLSTAT software

- Either click the link ‘Download file for PC/Mac’ or right click the link and choose ‘Save as Link (K)’.

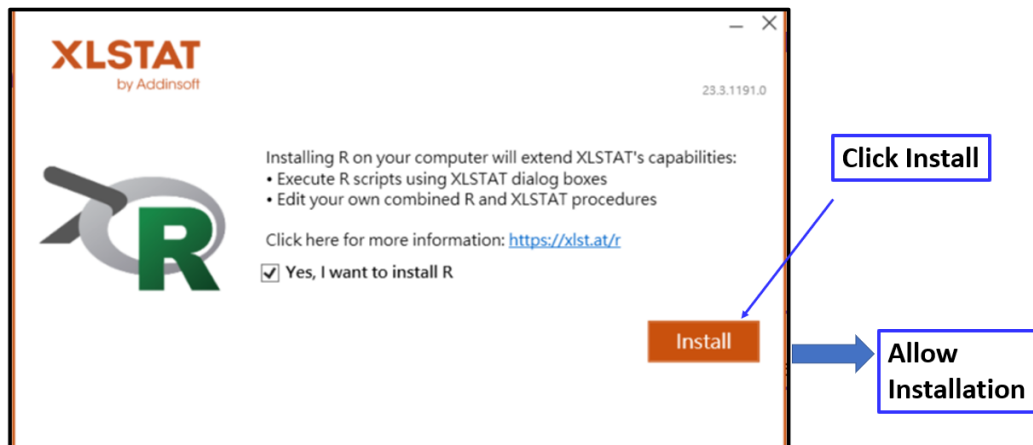
The screenshot shows the 'License Key' section with a text box containing 'XXXXXXXXXXXXXXXXXXXXXXXXXXXX'. Below it is an important instruction: 'Important: Write down (and copy) your License Key before downloading the software. Save your License Key. You will need this key to properly install XLSTAT.' The 'Download XLSTAT™' section has a callout box that says 'Either click the link or Right Click → Save as Link (K)'. Below this is a table of download links.

File	Comments	System	Link
xlstat.exe	Excel 2003, 2007, 2010, 2013, 2016 with latest service pack	Windows Vista, Windows 7, Windows 8, Windows 10	Download file for PC
xlstat.dmg	Excel 2011, 2016 with latest service pack	Mac OS X ≥ 10.6	Download file for Mac

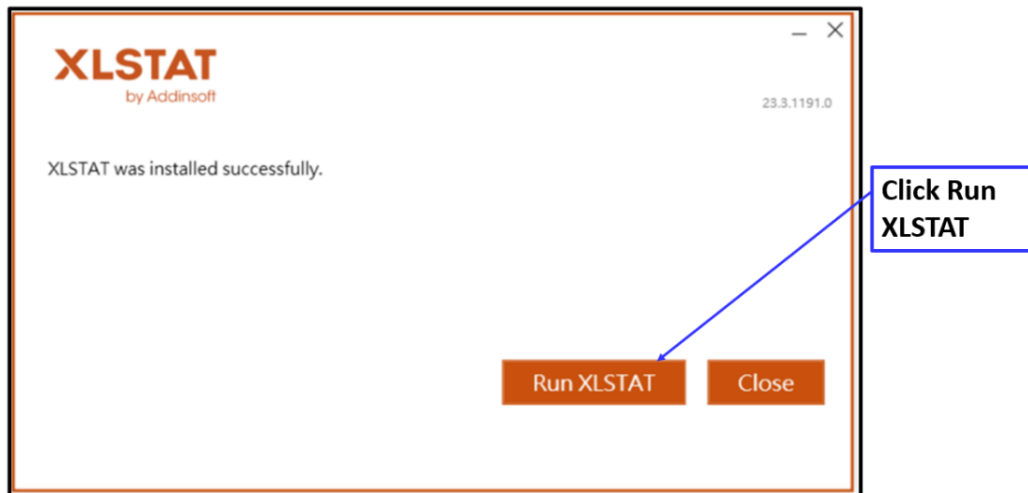
- Wait** for the completion of the downloading process. **Double click** the downloaded file (xlstat.exe) to **start the installation process**. Allow time for the program to run. Click the **Continue** button.

The screenshot shows the XLSTAT installation window. The title bar says 'XLSTAT by Addinsoft' and the version is '23.3.1191.0'. The main text reads: 'XLSTAT will be installed on your computer for: Excel 2019 (64-bit)'. At the bottom, there is a checkbox that is checked, with the text 'I have read and I agree with the [XLSTAT end-user license agreement.](#)'. To the right of the checkbox is an orange 'Continue' button. A callout box points to this button with the text 'Click Continue'. Below the 'Continue' button is a link for 'Advanced'.

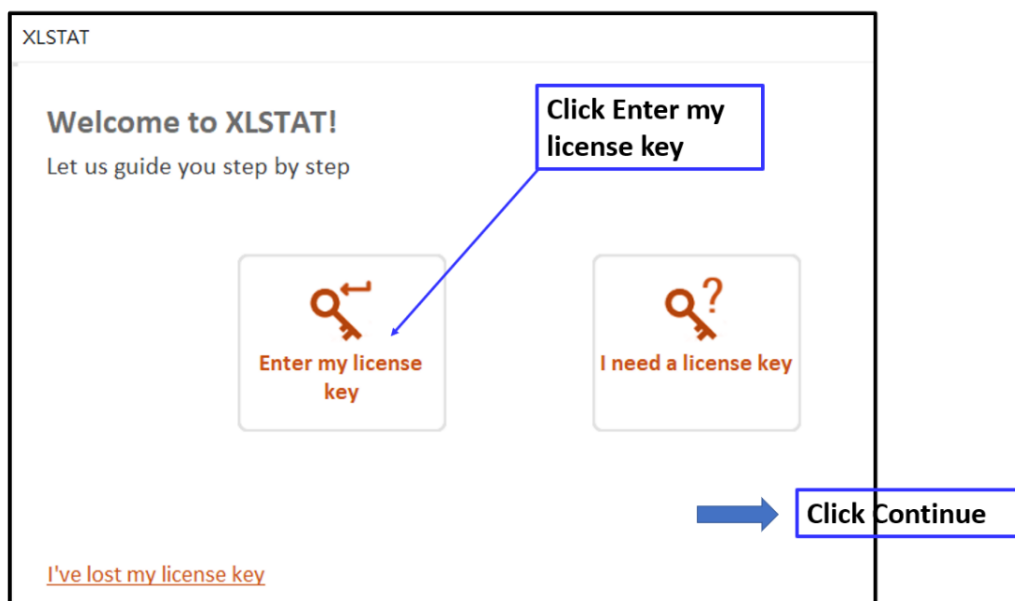
3. Click the **Install** button to allow XLSTAT installation. Allow time for the program to run.



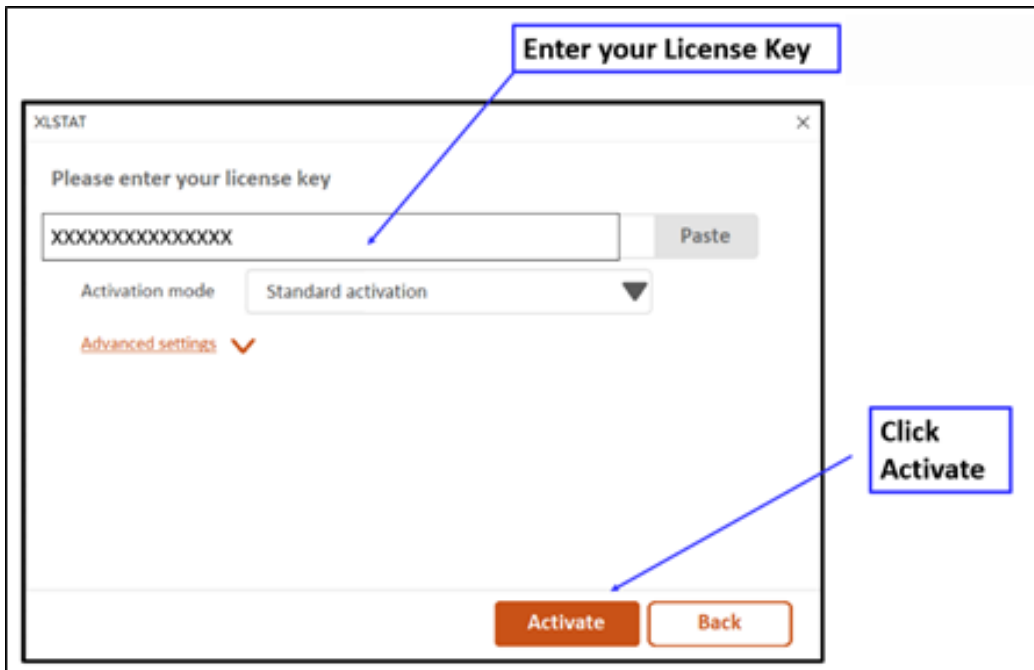
4. Click the **Run XLSTAT** button to run XLSTAT.



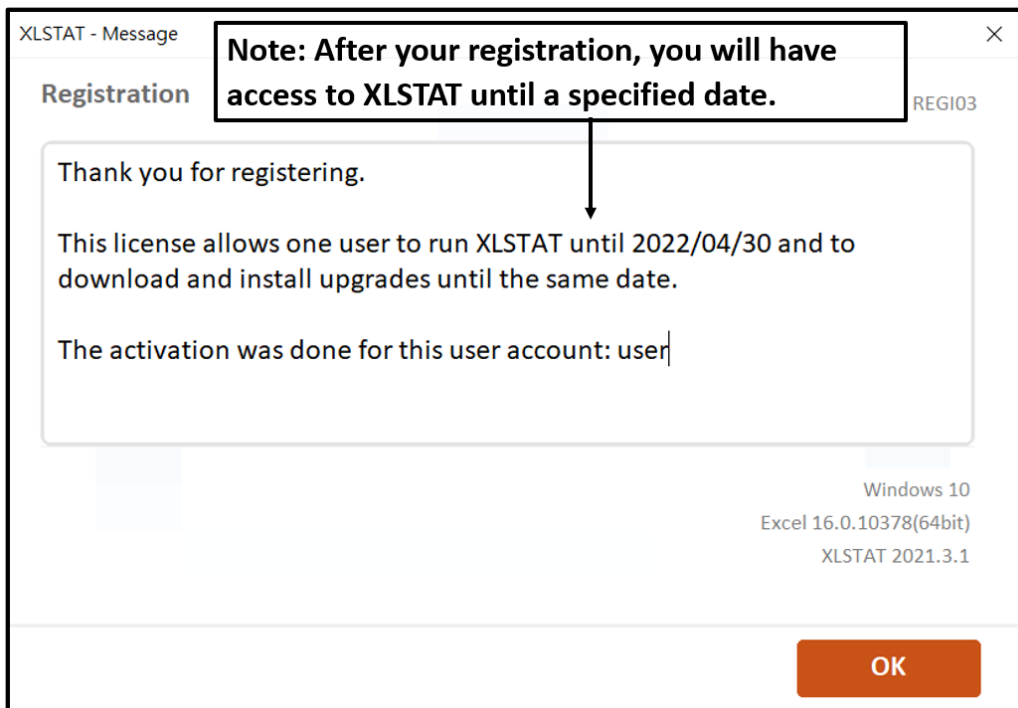
5. Click **Enter my license key** → Click **Continue**.



6. Enter your unique license key → Click the **Activate** button.

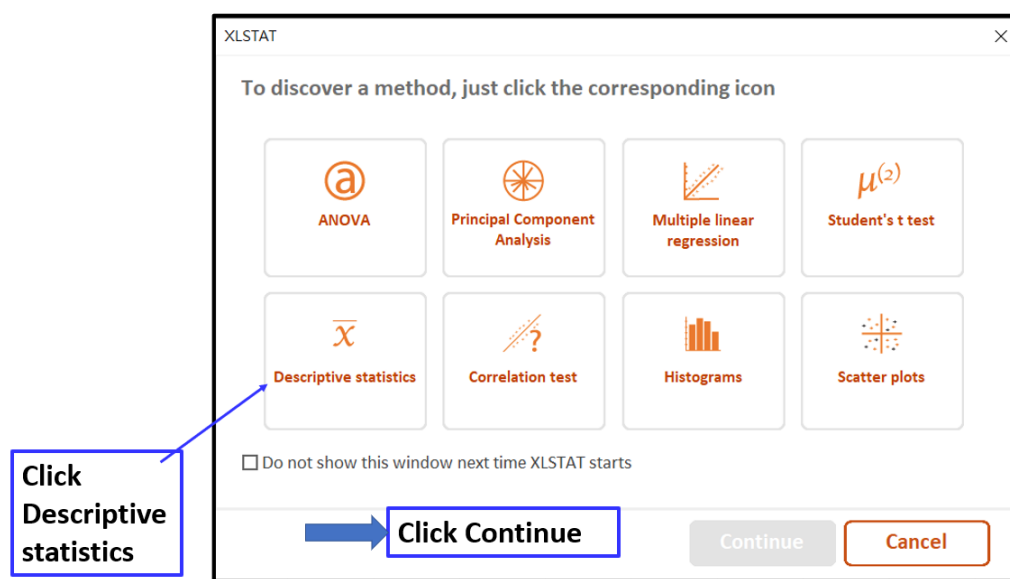


7. The successful account activation message will appear. Note down the software expiration date. Then click **OK**.



The installation is complete at this point. An icon (**XLSTAT**) will appear on your computer's desktop.

8. To learn how to get started with XLSTAT, please refer to **Appendix A** of the *Study Guide* for *Unit 1*.



Where to get help

If you find yourself having any trouble with any aspect of this course, there are several ways you can find help.

From your tutor

Your tutor is there to help you understand the ideas in the course, and the best way for him or her to do this is through the comments written on your assignment scripts. When your assignment is returned, go through the script, and take note of the comments written by your tutor; they will help you avoid similar errors in later assignments and in the examination. Also try to attend tutorials and surgeries because there you will have the opportunity to talk to your tutor directly and, just as importantly, to talk to other students. If you have further academic queries, you may consult your tutor either by email or by telephone.

From your fellow students

One of the best ways of learning is by talking about your work with fellow students. Unfortunately, you will see them only at the infrequent tutorials during the year. That leaves a lot of weeks when you could be on your own. Make sure then that you have the addresses and telephone numbers of other *STAT 2420SED* students in your area; that way, you can stay in touch more frequently. You might even like to form your own self-help group to meet regularly; this is often a good way of getting people to discuss common difficulties, especially in the assessment questions.

From the Course Coordinator

If there are any academic queries that your tutor cannot settle for you, then your tutor will probably advise you to contact the Course Coordinator.

From the OLE discussion board and email

OLE discussion board: Problems and queries can be posted for students and tutors to offer help. This has been a popular way for students to get help. Often you can find the answer to your problem in a similar problem posted by another student.

Email: Each student and tutor has an email account for direct communication between individuals and groups. Most of the news and comments from the Course Coordinator and tutor will be sent to you through this email system.

Keeping up with the course schedule

It is important to keep as close to the schedule laid down in the course schedule as you can (of course there is no harm in being ahead of it, but few students are in the fortunate position of being able to keep that up for any length of time). The main reason for keeping up to schedule is that you will lose marks if you miss any questions on the assignments. For many of the assignments, the due date is very soon after the end of the study week for the last of the relevant units. We recommend that you finish the assignment questions for each unit as soon as you finish the unit, otherwise you will have a lot of work to do in a few days before the due date.

If you have not done all the work in time for an assignment, you should still submit as much of the assignment as you can do, and start the new unit on time. As a matter of survival, it is more important to start each unit on time than to do every assignment question.

If it becomes apparent during your study that you will not have enough time to do all the work in it, you will have to make some decisions about which parts of which units to leave out. **Such omissions will, in general, cause you to lose marks in your assignments**, but this is better than getting hopelessly behind and dropping out.

Appendix A: Course contents

Unit 1 Data analysis and descriptive statistics

- The nature of statistics (Weiss Chapter 1)
 - Statistics basics
 - Simple random sampling
 - Other sampling designs
- Organising data (Weiss Chapter 2)
 - Variables and data
 - Organising qualitative data
 - Organising quantitative data
 - Distribution shapes
- Descriptive measures (Weiss Chapter 3)
 - Measures of centre
 - Measures of variation
 - The five-number summary; boxplots
 - Descriptive measures for populations; use of samples

Unit 2 Measuring chance and probability

- Probability concepts (Weiss Chapter 4)
 - Probability basics
 - Events
 - Some rules of probability
 - Contingency tables; joint and marginal probabilities
 - Conditional probability
 - The multiplication rule; independence
 - Bayes's rule

Unit 3 Sampling distribution of the sample mean and confidence intervals

- The normal distribution (Weiss Chapter 6)
 - Introducing normally distributed variables
 - Areas under the standard normal curve
 - Working with normally distributed variables
 - Assessing normality; normal probability plots
- The sampling distribution of the sample mean (Weiss Chapter 7)
 - Sampling error; the need for sampling distributions
 - The mean and standard deviation of the sample mean
 - The sampling distribution of the sample mean
- Confidence intervals for one population mean (Weiss Chapter 8)
 - Estimating a population mean
 - Confidence intervals for one population mean when σ is known
 - Confidence intervals for one population mean when σ is unknown

Unit 4 Hypothesis tests for one population mean

- Hypothesis tests for one population mean (Weiss Chapter 9)
 - The nature of hypothesis testing
 - Critical-value approach to hypothesis testing
 - P -value approach to hypothesis testing
 - Hypothesis tests for one population mean when σ is known
 - Hypothesis tests for one population mean when σ is unknown
 - The Wilcoxon signed-rank test

Unit 5 Hypothesis tests for two population means

- Inferences for two population means (Weiss Chapter 10)
 - The sampling distribution of the difference between two sample means for independent samples
 - Inferences for two population means, using independent samples: standard deviations assumed equal
 - Inferences for two population means, using independent samples: standard deviations not assumed equal
 - The Mann–Whitney test

- Inferences for two population means, using paired samples
- The paired Wilcoxon signed-rank test

Unit 6 Categorical data analysis

- Chi-square procedures (Weiss Chapter 13)
 - The chi-square distribution
 - Chi-square goodness-of-fit test
 - Contingency tables; association
 - Chi-square independence test
 - Chi-square homogeneity test

Unit 7 Relationships and regression analysis

- Descriptive methods in regression and correlation (Weiss Chapter 14)
 - Linear equations with one independent variable
 - The regression equation
 - The coefficient of determination
 - Linear correlation
- Inferential methods in regression and correlation (Weiss Chapter 15)
 - The regression model; analysis of residuals
 - Inferences for the slope of the population regression line
 - Estimation and prediction
 - Inferences in correlation