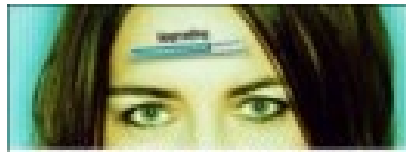


CURSUSSEN STATISTIEK

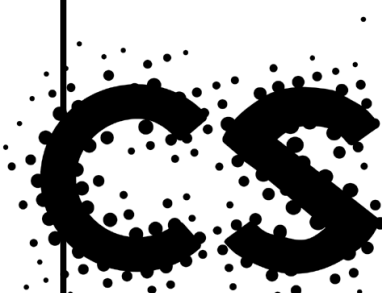
PERMANENTE VORMING
2006-2007



OPLEIDINGSCHEQUES

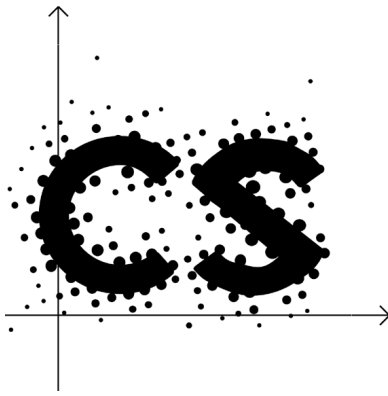
WIJ AANVAARDEN DE
OPLEIDINGSCHEQUES VAN
DE VLAAMSE GEMEENSCHAP

WE ACCEPT THE TRAINING
CHEQUES OF THE FLEMISH
COMMUNITY



CENTRUM VOOR STATISTIEK
KRIJGSLAAN 281 S9
9000 GENT

INSTITUUT VOOR PERMANENTE
VORMING IN DE WETENSCHAPPEN
KRIJGSLAAN 281 S3
9000 GENT



CENTER FOR STATISTICS

STATISTICS

Continuing Education 2006-2007



**INSTITUTE FOR
CONTINUING EDUCATION**

VOORWOORD

“Statistiek” is de laatste decennia onmisbaar geworden in heel wat takken van de wetenschap. Denk maar aan wetgeleerden die bewijsmateriaal wegen, sociologen die oorzaken van gedrag natrekken, artsen en biowetenschappers die DNA-chips analyseren of de effectiviteit van nieuwe interventies evalueren, bio-ingenieurs die de kwaliteit van het milieu bewaken, industriëlen die de productiekwaliteit bijsturen, economen die financiële tijdreeksen bestuderen,... Met de komst van gebruiksvriendelijke software wordt het opslaan en manipuleren van data haast kinderspel. Veel minder evident is het om relevante en kwaliteitsvolle gegevens te verzamelen, om efficiënt informatie te onttrekken en niet misleid te worden door naïeve conclusies. Een techniek en de interpretatie van haar resultaten hangen immers fundamenteel samen met het design en de implementatie van de studie, vaak ook met bijkomende onderstellingen over een complexe datastructuur.

Het Centrum voor Statistiek van de Universiteit Gent, in samenwerking met het Instituut voor Permanente Vorming van de Faculteit Wetenschappen (IPVW), organiseert daarom elk jaar cursussen die inspelen op de noden van gebruikers van statistische methoden. Het aanbod richt zich vooral op het verwerven van inzicht in de basis van het statistisch onderzoek. PC-practica stellen de kandidaat in staat om ook al doende te leren. Het doelpubliek bestaat uit professionelen en onderzoekers met een academische vorming. Of u nu kennis wil opfrissen, op de hoogte wil blijven van recente ontwikkelingen, of belangstelling heeft voor een nieuw onderzoeks domein, deze formule wil u in staat stellen om gericht kennis en vaardigheden op te doen. De nieuwe inzichten zullen uw bedrijf en uw onderzoek de extra voorsprong geven die het verdient. Ook de Vlaamse regering ziet zo'n training als een troef voor haar economisch beleid. Professionelen kunnen genieten van financiële steun onder de vorm van de opleidingscheque. Meer informatie over dit 'stimulerend middel' vindt u op de website www.vlaanderen.be/opleidingscheques of via de link op de IPVW-website: www.ipvw-ices.UGent.be.

In ons programma voor het komend academiejaar bieden we opnieuw, tussen oktober 2006 en half maart 2007, ons vast pakket basismodules aan, waarin kennis in statistiek gradueel wordt opgebouwd. Het is elk jaar onze doelstelling dit aan te vullen met een aantal hoogstaande gespecialiseerde cursussen. We starten hiermee in september 2006 met de cursus “Family-Based Genetic Association Testing”, waarbij ingespeeld wordt op de groeiende belangstelling in analyse van genetische data en associatie met familiaal-gelinkte karakteristieken. In november 2006 bieden we een driedaagse aan omtrent “Design and analysis in Clinical Trials”. Eind maart 2007 komt in “Logistic Regression” het modelleren aan bod van binaire data in termen van zowel categorische als continue voorspellers. We sluiten ons programma af in april 2007 met “Multilevel Analysis” waarin het probleem van hiërarchische structuren in data wordt aangepakt. Verschillende cursussen worden in het Engels gedoceerd. Ons doel blijft om iedereen maximaal te laten genieten van deze kans tot bijkomende opleiding. Het geheel verloopt in een gemoedelijke sfeer met ruime mogelijkheid tot interactie met de docenten.

Graag brengen we onder uw aandacht dat aan de Universiteit Gent een Master opleiding in Statistische Data-Analyse loopt, die wetenschappers uit diverse disciplines een grondige vorming aanbiedt in de methodes van de toegepaste statistiek. Meer info hierover vindt u via onze website www.cvstat.ugent.be.

We hopen dat u het nieuwe aanbod kan smaken en wensen u alvast een leerrijk en productief jaar toe!

INTRODUCTION

“Statistics” has become indispensable in many branches of science. Lawyers weighting evidence, sociologists and psychologists searching to explain behaviour, biologists analyzing DNA-chips, physicians evaluating new interventions, bio-engineers monitoring the environment, managers imposing quality control, economists studying time series, ... they all rely on statistical methods. Today’s user-friendly software allows anyone to store and manipulate data quite easily. It remains a challenge however, to gather relevant, high-quality data and retrieve information efficiently to draw accurate inference. Without training and due professionalism one runs a high risk of arriving at misleading conclusions. One must be able to recognise how the appropriate statistical technique and justified interpretation depend fundamentally on the design and implementation of a study in combination with any assumptions about the data structure.

To meet the needs of users of statistical methods, the Centre for Statistics of Ghent University in co-operation with the Institute for Continuing Education of the Faculty of Science (ICES) organises a series of courses each year. Our goal is to provide insight in the basics of statistical research. Practical sessions on the PC allow participants to obtain this through hands-on experience. Our courses are aimed at professionals and participants with an academic training, who wish to refresh their knowledge, keep it up to date or discover new areas of research. The program is designed to offer very specific knowledge and skills through separate modules. The new insights will give your company or research the extra edge it needs. The Flemish Community regards continuing training as an important aspect in its economic policy. Professionals are granted financial support through the government’s introduction of training cheques. More information about this stimulating initiative can be found on the website of the Flemish Community, www.vlaanderen.be/opleidingscheques (Dutch) or via the link on the ICES-website, www.ipvw-ices.UGent.be (English).

In our 2006-2007 program we continue to offer our classic series of basic modules which gradually build up knowledge in statistical techniques. These modules run from October 2006 until March 2007. Every year we aim to supplement these with a number of highly qualified courses. The first of these starts in September 2006 with “Family-Based Genetic Association Testing”, which is a tool box of advanced statistical genetic techniques. In November 2006 we offer a three-day course on “Design and analysis in Clinical Trials”. In the last week of March 2007 the course “Logistic regression” presents models for binary data in terms of categorical as well as continuous predictors. We close our program with a module on “Multilevel Analysis”, which deals with data that are hierarchically structured. We continue to present several modules in English to give international candidates the opportunity to participate. All modules take place in a pleasant atmosphere with ample opportunity to interact with the lecturers.

The University of Ghent also presents a Masters program in Statistical Data-Analysis. This program offers a more profound insight in the methods of practical statistics to scientists in diverse areas. For more information visit our website www.cvstat.ugent.be.

We hope the new program meets your expectations and wish you an enjoyable and productive learning experience!

MODULE 1: Short Course in Family-Based Genetic Association Testing

Prof. dr. Nan Laird, Prof. dr. Christoph Lange, Prof. dr. Kristel Van Steen

Course Description: The increasing availability of genetic marker data, especially single nucleotide polymorphisms (SNPs), has made investigations of genetic associations between marker data and disease commonplace. This course will focus on family-based designs for association studies; these designs use information on affected individuals and their relatives, most commonly parents and/or siblings. Family-based designs are attractive in that they test for both association and linkage and avoid difficulties with population stratification and admixture. This course will give a very brief introduction to the basic concepts of genetic association in general, and family-based designs in particular. The focus of the course is on the FBAT/PBAT methodology and how to use the packages. The orientation of the course is practical rather than theoretical. It combines lectures and computer tutorials with hands on data analysis using the FBAT and PBAT packages. Both packages can be accessed from the FBAT/PBAT web pages www.biostat.harvard.edu/~clang/default.htm and www.biostat.harvard.edu/~fbat/default.html.

Dates and venue: September 11, 2006 from 8 am till 5 pm, September 12, 2006 from 8.30 am till 5 pm. Participation in a consult or test is optional and will take place on September 13, 2006 from 9 am till noon. The course will be given in the PC-room of the Biomedical Library at the Ghent University Hospital, De Pintelaan 185 – UZ P8, 9000 Ghent, Belgium.

Target audience: This course is intended for clinicians, epidemiologists, data analysts, geneticists and statisticians involved in the analysis of genetic data or scientists who would like to become more involved in the analysis of these data. The number of participants is limited to 50.

Exam: Participants can, if they wish, take part in an exam on the morning of the third day. A certificate from the University will be issued to participants with at least a degree at the bachelor level or an equivalent degree, upon succeeding in this test.

Course prerequisites: A background in basic statistics is highly desirable; basic knowledge about genetic concepts is a surplus. Participants are encouraged to bring their own data sets; check the FBAT web page for details on file format.

Course material: A special website will be created for the course so that all course materials will be available there. We strongly recommend that participants read the manuals before attending the course. Only a limited number of paper copies of lecture notes will be available as handouts, while the course is ongoing.

Fees: The registration fee for the first 2 days amounts to 1,000 EUR for participants of the private sector and 500 EUR for employees of universities, the government, the non-profit and the social-profit sector. A special rate of 300 EUR applies to (doctoral) students. The fee includes all provided additional course material and luncheons on day 1 and day 2. Optionally, students can subscribe to a test on day 3 to become a certificate (at no additional cost); other participants can obtain consulting about their own genetic data analysis problems related to the topic of the course (at an additional cost of 600 EUR for the private sector and 300 EUR otherwise). Please use the separate registration form to enrol for this course and specify whether you subscribe for a test or consult on day 3.

MODULE 2: Inleiding tot SPSS

Dhr. Kris Erauw

Beschrijving: We leven in een kennismaatschappij. Heel veel mensen verzamelen gegevens of willen bepaalde ideeën met onderzoeksbevindingen ondersteunen. Denk aan de jongeren in een stedelijke jeugdraad die in hun jeugdwerkbeleidsplan de geformuleerde beleidslijnen moeten ondersteunen met onderzoeksbevindingen; of aan de voorzitter van een oudercomité die de standpunten van ouders op een wetenschappelijk verantwoorde manier wil bevragen. Het verzamelen en opslaan van al die gegevens is vaak niet zo evident als het lijkt. Zeker niet als het de bedoeling is de gegevens later op een professionele manier te verwerken.

Deze lessenreeks is erop gericht data in een bruikbare vorm te verzamelen, de ingezamelde data in SPSS op te slaan en middels SPSS de eerste beschrijvende statistieken te produceren.

De verschillende lessen in de reeks zijn ervaringsgericht opgevat. De deelnemers worden met een aantal problemen geconfronteerd waarna mogelijke oplossingen besproken en gedemonstreerd worden.

Les 1. *Data en dataverzameling:* data in SPSS invoeren en definiëren, data uit andere programma's importeren en gebruiken.

Les 2. *Elementaire bewerkingen:* samenvattende statistieken en voorstellingen genereren, variabelen herschrijven en combineren, databestanden bewerken en combineren.

Les 3. *Gemiddelden vergelijken:* grafische voorstelling van gemiddelden, t-toetsen en one-way variantie-analyse.

Les 4. *Meer uit je databestand halen:* de eerste stappen in lineaire regressie.

Data: 2, 3, 5 en 6 oktober 2006 telkens van 17u tot 20u.

Plaats: PC-klas 2 van de Faculteit Psychologische en Pedagogische Wetenschappen, Henri Dunantlaan 2, Gent.

Doelpubliek: Deze practica zijn bedoeld voor alle personen die gegevens verzamelen en/of opslaan, met de bedoeling deze statistisch te analyseren en te interpreteren.

Toelatingsvoorwaarden: Geen

Lesmateriaal: Documentatie- en oefeningenbundel.

Prijs: De deelnameprijs bedraagt 325 EUR voor deelnemers uit de private sector, 175 EUR voor UGent-personeelsleden en personeel uit de non-profit, social-profit en overheidssector. Een gereduceerde prijs van 125 EUR geldt voor doctoraatsstudenten. In deze prijs is o.a. het lesmateriaal ingesloten.

MODULE 3: Introductory Statistics. Basics of Statistical Inference

Prof. dr. Maria Ysebaert

Course description: This course aims to provide insight into basic statistical concepts with emphasis on practical applications. Mathematical formulae will be kept to a minimum. The theory and the methods of analysis will be extensively illustrated with examples relating to a wide variety of different fields.

We start with concise graphical and numerical descriptions of data obtained from observational or experimental studies. The most common and frequently used probability distributions of discrete and continuous variables will be presented. Statistical inference draws conclusions about a population based on sampled data. Chance variations are taken into account such that a level of confidence is attached to these conclusions. We present the reasoning behind significance tests for the comparison of observed data with a hypothesis, the validity of which we want to assess. We apply this procedure to data obtained either from one or from two populations. The correct use of the t-test will be discussed. Nonparametric methods are considered as a possible alternative in case the requirements of the t-test are not met. We cover the basic concepts of hypothesis testing for categorical data, including the chi-square test. Quite often the relationship between two variables, where the outcome of one variable is seen as depending on the value of the other, is the focus of scientific interest. We will give an introduction to linear regression analysis, where a regression line based on observations obtained in a sample describes this relation.

Dates and venue: October 31, November 7, 14 and 28, December 5, 12 and 19, 2006 from 5.30 pm till 9.30 pm (each lecture is followed by a hands-on practical session) at the Faculty of Science, Building S9, Campus Sterre, Krijgslaan 281, Ghent.

Target audience: This course will benefit investigators from diverse areas, research scientists, clinical research associates, and, in general, anyone who comes in contact with data handling and who wants to acquire insight into basic statistical methods or who feels that his/her knowledge and practice of statistics needs refreshing. No extensive background in mathematics is required.

Exam: Participants can, if they wish, take part in an exam at a date which will be specified later. A certificate from the University will be issued to participants with a university degree at the bachelors level or an equivalent degree upon succeeding in this test. As such this course can be incorporated in the doctoral training program.

Course prerequisites: The course is open to all interested persons.

Course material: Copies of lecture notes.

Recommended handbooks are:

Book 1: "Fundamentals of Biostatistics", Bernard Rosner, 6th ed. (2005), Duxbury Press.

Book 2: "Introduction to the Practice of Statistics", David S. Moore and George P. McCabe, 5th ed. (2005), W.H. Freeman and Company.

Fees: The registration fee amounts to 700 EUR for participants of the private sector, 300 EUR for employees of Ghent University, the government, the non-profit and social-profit sector. A special rate of 200 EUR applies to doctoral students. The book is optional and can be bought separately at the price of 70 EUR. Please indicate this clearly on the registration form.

MODULE 4: Design and Analysis of Clinical Trials

Prof. dr. Els Goetghebeur and Prof. dr. David Harrington

Course description: Experiments involving the health of human beings carry serious challenges and risks, but form one of the richest sources of information on causal effects of interventions. They have been responsible for progress in medicine, leading to lives saved and improved quality of life. To obtain relevant information in an efficient and ethical manner, such experiments must be carefully designed and executed, correctly analyzed and reported. In this course we will stress concepts and practical examples. We will start by discussing various designs for clinical trials used for instance during drug development. These include placebo-controlled simple, stratified, cross-over, factorial and sequential designs. We will discuss ways of randomizing patients and will stress the importance of a sufficient sample size to obtain reliable results. We will discuss the value of data monitoring including rules for early stopping due to futility or efficacy. Concepts will be illustrated by discussing published clinical trials from cancer, HIV and other diseases.

Dates and venue: November 21, 22 and 23, 2006 from 5.30 pm till 9 pm at the Faculty of Science, Building S9, Campus Sterre, Krijgslaan 281, Ghent.

Target audience: This course is designed for biomedical researchers who wish to critically evaluate results from clinical trials or are engaged in the design, execution, analysis and reporting of a clinical trial.

Exam: Participants can, if they wish, take part in an exam at a date, specified later. A certificate from the University will be issued to participants with a university degree at the bachelors level or an equivalent degree upon succeeding in this test.

Course prerequisites: Participants will be assumed to have a working knowledge of the basic statistical concepts: sampling, population, hypothesis testing, confidence intervals, means, survival probabilities .

Course material: Copies of lecture notes and published articles. Recommended text book: "Fundamentals of clinical trials", L. Friedman, C. Furberg, D. De Mets, 3rd ed., 1999, Springer.

Fees: The registration fee amounts to 400 EUR for participants of the private sector, 200 EUR for employees of Ghent University, the government, the non-profit and social-profit sector. A special rate of 100 EUR applies to doctoral students. The book is optional and can be bought separately at the price of 65 EUR. Please indicate this clearly on the registration form.

MODULE 5: Analysis of Variance

Prof. dr. Maria Ysebaert

Course description: Analysis of variance (ANOVA) is a statistical tool used in the comparison of means of a random variable in populations that differ in a characteristic (factor), e.g. treatment, age, sex, subject, etc. First, we cover one-way ANOVA, where only one factor is of concern. Depending on the type of the factor, the conclusions pertain to just those factor levels included in the study (fixed factor model), or the conclusions extend to a population of factor levels of which the levels in the study are a sample (random effects model). In two-way and multi-way ANOVA (populations differ in more than one characteristic), the effects of factors are studied simultaneously to obtain information about the main effects of each of the factors as well as about any special joint effects (factorial design). In nested designs, where each level of a second factor (mostly a random factor) occurs in conjunction with only one level of the first factor, analysis of variance enables us to extract the variability induced by the nested factor from the effects of the main factor. For correct analysis of the data in multi-way ANOVA, not only the linear model and the type of factor have to be considered but, also, the assumptions that must be satisfied.

In this course we will focus on correct execution of data analysis and understanding the results of this analysis. We will provide insight into the conclusions and pay attention to expressing these conclusions in a correct and understandable way. The different methods will be extensively illustrated with examples from scientific studies in a variety of fields.

Dates and venue: January 4, 9, 16, 23 and 30, February 6, and 13, 2007 from 5.30 pm to 9.30 pm (each lecture is followed by a hands-on practical session) at the Faculty of Science, Building S9, Campus Sterre, Krijgslaan 281, Ghent.

Target audience: This course will benefit investigators from a diversity of areas, who need to use statistical methods in the collection and handling of data in their research, in particular for assessing the effect of e.g. different treatments.

Exam: Participants can, if they wish, take part in an exam. A certificate from the University will be issued to participants with a university degree at the bachelor level or an equivalent degree upon succeeding in this test. As such this course can be incorporated in the doctoral training program.

Course prerequisites: Participants are expected to have an active knowledge of the basic principles underlying statistical strategies, at a level equivalent to the Introductory Statistics course of this program. In the first session, on January 4, these principles will be briefly reviewed. Participants who have recently followed the Introductory course are exempt from that first session.

Course material: Copies of lecture notes.

Recommended handbook: "Applied Linear Statistical Models", Michael H. Kutner, Christopher J. Nachtsheim, John Neter and William Li, 5th ed. (2005), McGraw-Hill.

Fees: The registration fee amounts to 700 EUR for participants of the private sector, 300 EUR for employees of Ghent University, the government, the non-profit and social-profit sector. A special rate of 200 EUR applies to doctoral students. The book is optional and can be bought separately at the price of 75 EUR. Please indicate this clearly on the registration form.

MODULE 6: Lineaire Regressie

Prof. dr. Huguette Reynaerts

Beschrijving: Vertrekkend van een eenvoudig lineair model om één uitkomst te voorspellen op basis van één predictor, wordt progressief een arsenaal van technieken opgebouwd om op flexibele wijze te modelleren en te voorspellen. Het zoeken naar significante (causale?) associaties voor de variatie in uitkomsten, het zo goed mogelijk inschatten van de verwachte uitkomst op basis van een gegeven reeks variabelen, het voorspellen van de verwachte uitkomst (betrouwbaarheidsinterval) of de uitkomsten zelf (predictie-interval) vormen de hoofdbrok van deze module. Bijzondere aandacht gaat naar de interpretatie van parameters in het regressiemodel. Deze hangt af van het model voor de verwachte uitkomst, van de residuele variatie rond die verwachte uitkomst en, last but not least, van de proefopzet. In functie van concrete vragen worden, consistent met een gegeven dataverzameling, zo efficiënt mogelijk modellen geselecteerd. Hoe meer a priori onderstellingen, des te nauwkeuriger het antwoord. De statistische basisonderstellingen worden geverifieerd en onderzocht op tegenpraak met het feitenmateriaal. Tevens worden uitschieters in de waarnemingen en hun invloed op de conclusies bekeken. Meervoudige lineaire regressiemodellen zijn zeer flexibel. Zij incorporeren de t-test, variantieanalyse en covariantieanalyse. Men kan dus tegelijkertijd de invloed onderzoeken van discrete en van continue variabelen, corrigeren voor confounding en effectmodificatie, zekere niet-lineaire verbanden inbouwen. Er zijn echter ook grenzen aan de directe toepasbaarheid, die geleid hebben tot een waaier van uitbreidingen. In de cursus wordt naar oplossingen voor meer complexe problemen verwezen, zonder deze uit te diepen.

Data en Plaats: 15 en 22 februari, 1, 8, 15 en 22 maart 2007, telkens van 11u30 tot 15u (theorieles gevolgd door een hands-on practicum) op de Faculteit Wetenschappen, Gebouw S9, Campus Sterre, Krijgslaan 281, Gent.

Doelpubliek: Deze cursus richt zich tot allen die geregeld in aanraking komen met data en die inzicht willen verwerven in statistische dataverwerking.

Examen: Voor deelnemers die dit wensen wordt de module afgesloten met een examen. Deelnemers die slagen voor dit examen en houder zijn van een universitair diploma op het niveau van bachelor of een gelijkwaardig diploma, bekomen een universitair getuigschrift. De module kan als dusdanig worden opgenomen in de doctoraatsopleiding.

Vereiste voorkennis: Basiskennis over statistische besluitvorming is vereist om duidelijk inzicht te krijgen in de verschillende modellen. In de eerste sessie van Module 5, namelijk op 4 januari, worden deze principes bondig uiteengezet. Deelnemers aan de cursus Lineaire Regressie kunnen, zo gewenst, die voorbereidende sessie bijwonen.

Lesmateriaal: Basistekst van de lesgever.

Aanbevolen handboek: “Applied Linear Statistical Models”, Michael H. Kutner, Christopher J. Nachtsheim, John Neter and William Li, 5th ed. (2005), McGraw-Hill.

Prijs: De deelnameprijs bedraagt 700 EUR voor deelnemers uit de private sector, 300 EUR voor UGent-personeelsleden en personeel uit de non-profit, social-profit en overheidssector. Een gereduceerde prijs van 200 EUR geldt voor doctoraatsstudenten. Het bovenvermelde boek is optioneel en kan afzonderlijk aangekocht tegen een prijs van 75 EUR. Gelieve dit duidelijk op het inschrijvingsformulier aan te duiden.

MODULE 7: Logistic Regression

Prof. dr. Els Goetghebeur

Description: For those familiar with linear regression and the analysis of tabulated discrete data, it is natural to move to the regression analysis of binary outcomes. This course shows how binary data can be modeled in terms of both categorical and continuous predictors. We start from 2x2 tables, which have been stratified to account for confounders and/or effect modifiers. We demonstrate how their analysis can be based on the more general logistic regression model. Not only cohort studies, but also case control studies fit into this framework. We continue with more complex models which may involve continuous predictors. We focus on interpretation of the parameters, adequacy of the model, inspection of unduly influencing observations and stepwise model building. We point to extensions of the methods to analyze outcomes with more than two discrete levels, and correlated outcomes, such as matched pairs. Standard software assumes that sufficiently large sample has been obtained. When rare outcomes are being modeled, and cells in tables are sparsely populated, we must fall back on exact methods which are more computer intensive. We will demonstrate specialized software that allows to perform such analysis. All topics are illustrated using data sets from the biological and/or medical research field.

Dates and venue: March 26, 27, 29 and 30, 2007 from 5.30 pm to 9.30 pm (lectures on March 29 and 30 will be followed by a hands-on practical session) at the Faculty of Science, Building S9, Campus Sterre, Krijgslaan 281, Ghent.

Target audience: The course targets researchers in the (bio)medical field who need to analyze discrete data in the course of their investigations.

Exam: Participants can, if they wish, take part in an exam at a date, which will be specified later. A certificate from the University will be issued to participants with a university degree at the bachelors level or an equivalent degree upon succeeding in this test. As such this course can be incorporated in the doctoral training program.

Course prerequisites: Participants should have an active knowledge of the basic principles of statistics as taught in the modules 3 and 6. They should be familiar with linear regression and the analysis of 2x2 tables. Some experience with statistical software such as SPSS, SAS or stata is assumed.

Course material: Copies of lecture notes. Recommended textbook: “Applied logistic regression”, 2nd ed., D. Hoshmer, Jr. and A. Lemeshow (2000), Wiley.

Fees: The registration fee amounts to 400 EUR for participants of the private sector, 200 EUR for employees of Ghent University, the government, the non-profit and social-profit sector. A special rate of 100 EUR applies to doctoral students. The fee includes the lecture notes. The book is optional and can be bought separately at the price of 45 EUR. Please indicate this clearly on the registration form.

MODULE 8: Multilevel Analysis for Grouped and Longitudinal Data

Prof. dr. Joop Hox

Course Description: Social research often concerns relationships between individuals and the social contexts to which they belong. Individuals and their social contexts can be conceptualized as a hierarchical structure, with individuals nested within groups. Classical examples are educational research, with pupils nested within schools, and cross-national research, with individuals nested within their national units. Such systems can be observed at two levels, and as a result we have data with group level variables and individual level variables. To analyze such hierarchical structures, we need multilevel modeling, which allows us to study the relationships between variables observed at different levels in the hierarchical structure.

Multilevel modeling can also be used to analyze data from longitudinal research, by viewing measurement occasions as being nested within respondents. This has several advantages compared to more classical approaches to longitudinal data. In addition, multilevel models have been generalized to cover situations where data do not have a simple multilevel structure, such as cross-classified data or multiple-membership models.

This short course is intended as a basic and nontechnical introduction to multilevel analysis. It starts with a description of some examples, and shows why multilevel models are necessary if the data have a hierarchical structure. It then covers the basic theory of two- and three-level models. Next it explains how multilevel models can be applied to analyzing longitudinal data, and why and when this may be an attractive analysis approach, as compared to more classical analysis methods such as multivariate analysis of variance (Manova). Further topics are multilevel logistic models to analyze data where the outcome variable is dichotomous or a proportion, and multilevel multivariate modeling to analyze where there are multiple outcome variables.

Dates and venue: April 2, 3 and 4, 2007 from 9 am till 4 pm at the Faculty of Science, Building S9, Campus Sterre, Krijgslaan 281, Ghent. The course includes three computer labs, where multigroup and longitudinal data are analyzed. The computer labs in the course use the SPSS Mixed procedure, which is available in SPSS starting with version 11.5.

Target audience: This course will not only benefit applied researchers in the behavioral and social sciences, but whoever deals with data with a hierarchical or multilevel structure.

Course prerequisites: The course assumes reasonable familiarity with analysis of variance and multiple regression analysis, but prior knowledge of multilevel modeling is not assumed.

Course material: The course is based on: J.J. Hox (2002), "Multilevel Analysis. Techniques and Applications", Mahwah, NJ, Lawrence Erlbaum Associates.

Fees: The registration fee amounts to 700 EUR for participants of the private sector, 300 EUR for employees of Ghent University, the government, the non-profit and social-profit sector. A special rate of 200 EUR applies to doctoral students. The fee includes i.a. the lecture notes. The book is optional and can be bought separately at the price of 50 EUR. Please indicate this clearly on the registration form.

DE LESGEVERS

Dhr. Kris Erauw is stafmedewerker bij de dienst onderwijsondersteuning van de Faculteit Psychologie en Pedagogische Wetenschappen aan de Universiteit Gent. Hij stond jarenlang mee in voor de begeleiding van studenten bij de vakken statistiek en methodologie, en bij het schrijven van hun scriptie. Daarnaast ondersteunt hij onderzoekers bij het ontwikkelen van een gepast onderzoeksopzet en bij het verwerken van hun data.

Prof. dr. Els Goetghebeur chairs the Center for Statistics and the curriculum committee for the Advanced Master of Statistical Data Analysis at Ghent University, where she is associate professor in the department of applied mathematics and computer science. She is also adjunct associate professor in the department of biostatistics at the Harvard School of Public Health. She teaches courses in basic statistics, linear regression and survival analysis (Ghent and Harvard) and sometimes more specialized courses, e.g. on ‘analyzing noncompliance in clinical trials’ (Helsinki University, Universiteit Hasselt, Pfizer) and on ‘causal inference’ (course for the ph.d. program in statistics at Stanford University). Her research focuses on methodological problems encountered in the biomedical sciences, she has a special fondness for causal inference, survival analysis and a newly acquired taste for multiple testing for genetic associations. A recent excursion formed her involvement in a large project to study the optimal location of fire stations and ambulances in Belgium.

Prof. dr. David Harrington is Professor of Biostatistics in the Department of Biostatistics at the Harvard School of Public Health and Head of the Department of Biostatistics and Computational Biology at the Dana-Farber Cancer Institute. He conducts statistical research in survival analysis and collaborative research in cancer. He served as the Group Statistician for the Eastern Cooperative Oncology Group from 1990 to 2000, an organization of approximately 300 treatment sites conducting clinical and basic research in all adult malignancies. He is currently the Director of the Biostatistics Core Facility for the Dana-Farber/Harvard Cancer Center, a consortium of Harvard Medical School teaching affiliates, academic departments and laboratories with more than 750 investigators directly involved in cancer research. He is also the principal statistician for the Cancer Care Outcomes Research and Surveillance Consortium, a network of cancer registries and cancer centers organized to study patterns of cancer care among US physicians and access to care for subpopulations.

Prof. dr. Joop Hox is Professor of Social Science Methodology at the department of Methodology and Statistics of the Faculty of Social Sciences at Utrecht University. As Methodology chair, he is responsible for the research, development and teaching carried out at the faculty in the field of social science methods and techniques. His research interests focus on two lines of work: data quality in social surveys and multilevel modeling. The two lines of research reinforce each other, for instance in using multilevel methods to model complex survey data. He has acted as reviewer for national and international journals in the fields of survey methodology and statistics, and has been guest editor for special issues. His recent research focusses on survey nonresponse, interviewer effects, survey data quality, missing data problems, and multilevel analysis of regression and structural equation models.

Prof. dr. Christoph Lange is assistant professor of biostatistics at Harvard School of Public Health (Department of Biostatistics, Boston - USA). Recent topics in dr. Lange's current research line of statistical genetics include meta-analysis of linkage studies, GEE-methods in linkage analysis and marker-assisted selection. In the area of family-based association tests (FBATs), he has focused on the development of power calculations for family-based association studies, multivariate extensions of the FBAT statistic, FBATs for time-to-onset data and approaches to handle the multiple testing problem in family-based studies.

Prof. dr. Nan Laird is professor of biostatistics at Harvard School of Public Health (Department of Biostatistics, Boston – USA). Dr. Laird's major research interest is the development of statistical methodology in four primary areas: statistical genetics, longitudinal studies, missing or incomplete data, and analysis of multiple informant data. Areas of application include psychiatry, the environment, medical malpractice and the genetics of complex disorders.

Dr. Amy Murphy received her Doctorate of Philosophy degree in June 2006 at the Harvard School of Public Health (Department of Biostatistics, Boston, USA). Her primary research interest is in the area of statistical genetics, in particular, genetic association testing. Her current projects involve both family- and population-based study designs. In family-based association testing (FBAT), she has been developing methodology to address missing phenotype data in complex disease, FBATs which allow for an unspecified mode of inheritance, and approaches to address the multiple comparisons problem in genome-wide association studies. In population-based study designs, she has been focusing on power and sample size estimation in matched case-control studies. She is also involved in collaborative research in asthma genetics and cardiovascular genetics.

Prof. dr. Huguette Reynaerts is hoofddocent aan de Universiteit Gent, Vakgroep Toegepaste Wiskunde en Informatica. Ze is verantwoordelijk voor de cursussen statistiek in de Faculteit Economische en Toegepaste Economische Wetenschappen. Naast haar vorming als wiskundige aan de UGent, specialiseerde zij zich in de statistiek, de econometrie en het operationeel onderzoek aan de VUB. Haar wetenschappelijk onderzoek situeert zich op het gebied van de financiële stochastiek.

Prof. dr. Kristel Van Steen is guest professor at Ghent University (Department of Applied Mathematics and Computer Science, Ghent – Belgium) and GA²LEN project manager for Ghent University, which acts as coordinating partner in GA²LEN, the Global Allergy and Asthma European Network. Dr. Van Steen's research topics of interest are statistical genetics, in particular family-based association screening and the multiple testing problem, gene-gene and gene-environment interactions, missing or incomplete data and the analysis of complex data structures.

Prof. dr. Maria Ysebaert is eredocent van de Universiteit Gent. Zij ontving haar vorming als biochemicus aan de UGent, de University of Oregon Medical School en het Nobel Instituut te Stockholm. Naast biochemie, onderwees zij biostatistiek op kandidatuur- en postgraduaatniveau aan de Faculteit Diergeneeskunde van de UGent. Haar huidige wetenschappelijke interesse betreft statistische analyse in het onderzoek van moleculaire structuren van proteïnen.

REGISTRATION FORM STATISTICS 2006-2007

This form can also be found on our website: www.ipvw-ices.UGent.be

Please send, fax or e-mail this form to ICES no later than 4 working days before the start of the first selected module. Address: ICES – Krijgslaan 281, S3 – 9000 GHENT

Fax: +32 (0)9 264 49 83 **E-mail:** Isabel.DeZutter@UGent.be

Your registration is only valid after receiving a confirming email from our service.

Last Name:
 First name:
 Function:
 Company or institute:
 Address:

 Phone: Fax:
 E-mail:
 Date of birth**: .. / .. / 19.. Place of birth**: Gender**: M F
(** General information about age and gender of our participants is sent without names to Sodexho or Accor within the framework of the training cheques and is used on the certificates)
 Required for UGent-participants: SAP internal order number***: **43**
(*** intern bestelbonnr, verplicht voor deelnemers van UGent, gelieve ook de bestelbon zelf mee op te sturen)

Yes, I enrol for the following module(s) of the course in Statistics 2006-2007 organised by the Center for Statistics in co-operation with the Institute for Continuing Education in Science:

- M1: Family-based Genetic Association Testing → Please use the separate form.
- M2: Inleiding tot SPSS*
- M3: Introductory Statistics: Basics of Statistical Inference:
I order: No book Book 1 (Rosner) Book 2 (Moore & McCabe)
- M4: Clinical Trials: *I order: No book Book (Friedman et al.)*
- M5: Analysis of Variance: *I order: No book Book (Kutner et al.)*
- M6: Lineaire Regressie*: *I order: No book Book (Kutner et al.)*
- M7: Logistic Regression: *I order: No book Book (Hoshmer et al)*
- M8: Multilevel Analysis: *I order: No book Book (Hox)*

* These courses are taught in Dutch.

The total amount for my registration adds up toeuro, of whicheuro will be paid through use of training cheques for employees / training cheques for employers. I took note of the payment and cancellation procedure. Ghent University is free from VAT.

- I am: employed in the industry
 employed in the non-profit, social profit, government sector, a teacher, ...
 a (doctoral) student (Student card n°:)

INVOICE ADDRESS

Name:

Address:

.....

Date: Signature:

**REGISTRATION FORM:
SHORT COURSE IN FAMILY-BASED GENETIC ASSOCIATION TESTING**

Please send, fax or e-mail this form to ICES no later than 4 working days before the start of the course.

Address: ICES – Krijgslaan 281, S3 – 9000 Ghent, Belgium

Fax: +32 (0)9 264 49 83

E-mail: Isabel.DeZutter@UGent.be

Your registration is only valid after receiving a confirming email from our service.

Please keep in mind that places in this course are limited to 50 !

Last Name:

First name:

Function:

Company or institute:

Address:

Country:

Phone: Fax:

E-mail:

Date of birth ** : . . / . . / 1 9 . . Place of birth ** : Gender ** : M F
 (** General information about age and gender of our participants is sent without names to Sodexho or Accor within the framework of the training cheques and is used on the certificates)

Required for UGent-participants: SAP internal order number *** : **43**
 (***) please also send the internal order along too !)

Yes, I enrol for the Short Course in Family-based Genetic Association Testing organised by the Center for Statistics (CvS) and the Institute for Continuing Education in Science (ICES) on Monday September 11th and Tuesday September 12th 2006

Additionally I want to enrol for **one of the following activities** on Wednesday September 13th:

- Consult
- Exam (no extra cost)

I am: employed in the industry
 (1,000.00 EUR for the course + 600.00 EUR for consulting)

employed in the non-profit, social profit, government sector, a teacher, ...
 (500.00 EUR for the course + 300.00 EUR for consulting)

a (PhD)-student (Student card n°:)
 (300.00 EUR for the course + 300.00 EUR for consulting)

The total amount for my registration adds up to euro.

I am employed within the territory of the Flemish Community and will pay euro through use of O training cheques for employees / O training cheques for employers.

I will pay the total amount upon receiving the invoice for my registration.

I took note of the payment and cancellation procedure. Ghent University is free from VAT.

INVOICE ADDRESS

Name:

Address:

Date: Signature:

PRACTICAL INFORMATION

Registration

Please register via the registration form in this brochure. This form is also available at our website www.ipvw-ices.UGent.be.

Your registration is valid only after receiving a confirming e-mail from ICES.

The registration fee covers tuition, course materials, use of auditoria and PC, coffee and sandwiches.

Payment

The registration fee is due within 30 days following receipt of the invoice. Payment is possible through bank transfer with clear statement of the structured message on the invoice. All mentioned amounts are free from VAT.

Additional reduction

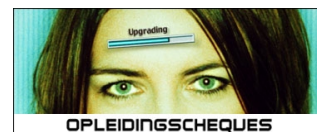
When 3 or more participants from the same company or institute enrol together through use of 1 registration form, for the same module(s), an additional overall reduction of 20 % is granted. Therefore, please check if anyone else at your institute or company might be interested or is already planning to participate. This reduction does not apply to (doctoral) students.

Cancellation

Cancelling is possible in writing until five days before the start of the concerning module, in which case 25% of the registration fee will be retained.

In case of cancellation within 5 days before the start of the module, the full registration fee is due.

Training cheques (Opleidingscheques)



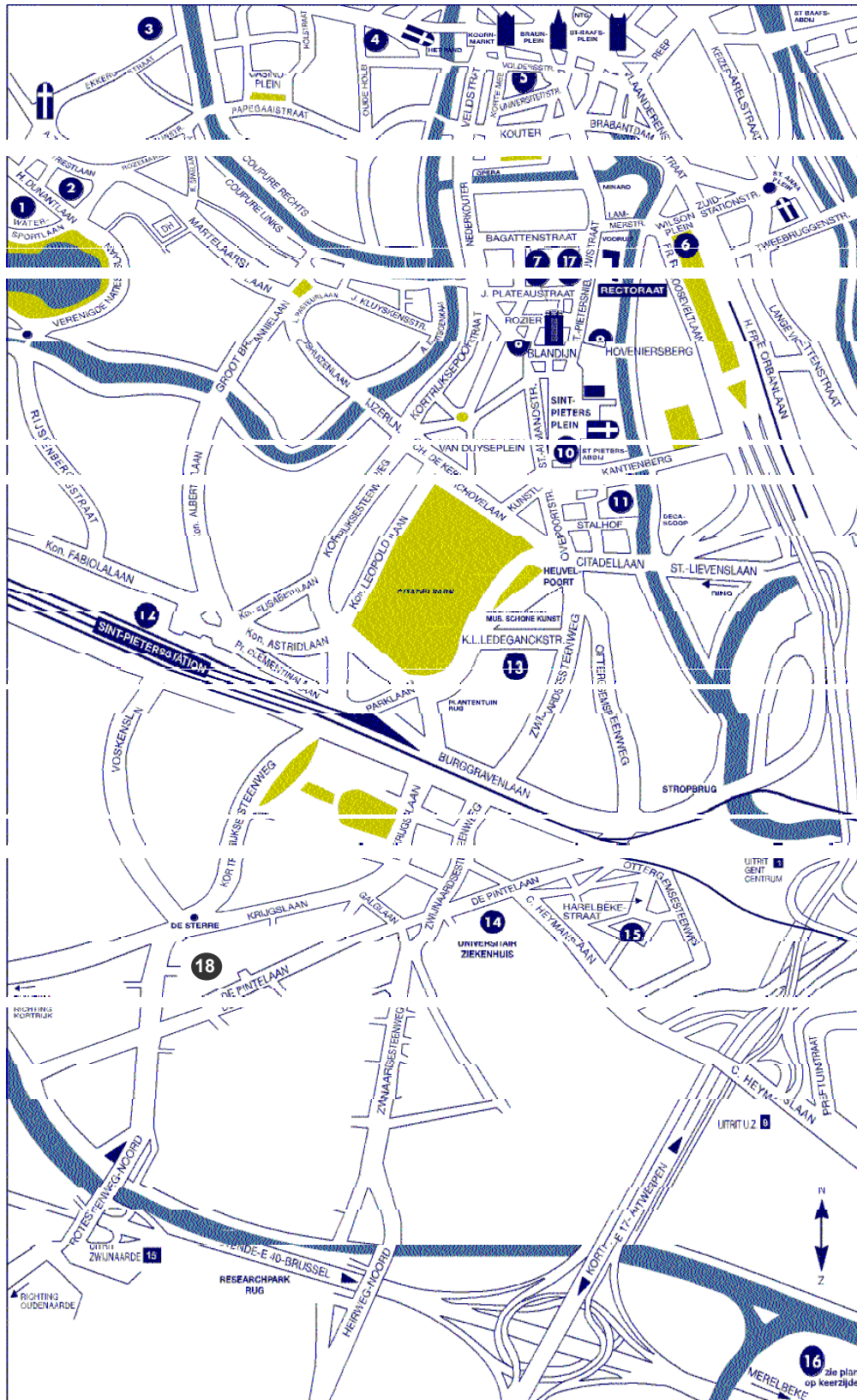
The training cheques are an initiative of the Flemish community to stimulate continuing education. There are 2 types of training cheques:

For employers (order them at www.opleidingscheques.be). Each cheque has a value of 30 EUR of which you pay half. The Flemish community pays the other half.

For employees (order them at www.vdab.be/opleidingscheques). A maximum of 250 EUR in cheques of 5, 10 or 25 EUR can be ordered by every Flemish employee each year. Again, half of the ordered amount is paid by the Flemish community.

On the mentioned sites you will find much more information about this initiative.

CURSUSLOCATIES



- 1 + 2: Fac. Psychologische en Pedagogische Wetenschappen, H. Dunantlaan 1 en 2
 14: Fac. Geneeskunde, Universitair Ziekenhuis, UZ Gent
 18: Fac. Wetenschappen, Campus Sterre, Krijgslaan 281, gebouw S9