# UNIVERSITÀ DEGLI STUDI DI PALERMO

| DEPARTMENT | Scienze Politiche e delle Relazioni Internazionali |
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| ACADEMIC YEAR | 2018/2019 |
| BACHELOR'S DEGREE (BSC) | ADMINISTRATION AND ORGANISATION SCIENCE AND LABOUR CONSULTING |
| SUBJECT | SOCIAL STATISTICS |
| TYPE OF EDUCATIONAL ACTIVITY | A |
| AMBIT | 50044-statistico-economico |
| CODE | 14400 |
| SCIENTIFIC SECTOR(S) | SECS-S/05 |
| HEAD PROFESSOR(S) | MENDOLA DARIA          Professore Ordinario          Univ. di PALERMO |
| OTHER PROFESSOR(S) | |
| CREDITS | 9 |
| INDIVIDUAL STUDY (Hrs) | 162 |
| COURSE ACTIVITY (Hrs) | 63 |
| PROPAEDEUTICAL SUBJECTS | |
| MUTUALIZATION | |
| YEAR | 2 |
| TERM (SEMESTER) | 2° semester |
| ATTENDANCE | Not mandatory |
| EVALUATION | Out of 30 |
| TEACHER OFFICE HOURS | **MENDOLA DARIA**<br><br>Tuesday    10:00    11:00    Ricevimento Online su piattaforma Teams (codice di accesso 5u94trz). Occorre *sempre* prenotarsi tramite portale unipa<br><br>Thursday    09:30    10:30    Dipartimento SPPEFF (campus di viale delle scienze, Palermo), edificio 15, piano 6, stanza P6 010. Occorre *sempre* prenotare almeno 2 gg prima tramite piattaforma. |

| PREREQUISITES | Elements of Mathematics at high school level (first order equations, cartesian coordinate system, Equation of a straight line, properties of power and square root function; the notion of logarithm).  Students are expected to review these topics from their high school books before the start of the Social Statistics lectures. |
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| LEARNING OUTCOMES | KNOWLEDGE AND UNDERSTANDING<br>- Ability to interpret and analyse statistical indexes, tables and plots;<br>- Knowledge of main statistical methodologies to describe a statistical population using univariate and bivariate elementary statistics.<br><br>APPLYING KNOWLEDGE AND UNDERSTANDING<br>- Ability to solve small problems based on results of simple statistical analyses.<br>- Ability to identify and use data to formulate responses to well-defined concrete and abstract problems;<br><br>MAKING JUDGEMENTS<br>- Ability to independently evaluate and compare diffenrt approaches to the solution of a theoretical problem using acquire statistical methodologies;<br>- Capacity to properly select, among different data analysis tools, those most appropriate to the nature of the discussed phenomena.<br><br>COMMUNICATION<br>- Ability to communicate information, ideas, problems and solutions, in a clear, concise and effective way, to both specialists and non-specialists. In order to gain these abilities, students have to acquire the essential elements of statistical language. In the classroom, the interaction will be stimulated by launching debate and discussion on topics from time to time proposed. Students will also be guided in acquiring the ability to interpret the data and communicate its information content through graphical or tabular representation and indexes.<br><br>LIFELONG LEARNING SKILLS<br>Students will be encouraged to empower their learning process relying on textbooks and materials and by meta-cognitive inputs; that will allow them to pursue higher level studies with a high degree of autonomy. |
| ASSESSMENT METHODS | Social statistics exam is composed by a  final written test (eventually completed by an oral exam).<br>The written exam of Social statistics spans over the whole syllabus and it includes both theoretical and practical (exercises) questions. Students are required to use the acquired statistical methods and techniques to describe small datasets, interpret and/or produce tables and graphs; and to make decisions based on their own data analysis.<br>The aim of the written test is to assess: a) knowledge and understanding, b) appropriateness of the specific language used, c) ability to communicate logical processes, to justify operated choices and to argue conclusions; d) making judgements.<br>The written test takes 110 minutes and allow to gain up to the maximum evaluation (30/30 cum laude). The oral exam of Social statistics takes place only in two cases: a) the evaluation is barely sufficient (quite near but less than 18/30);  or b) it is explicitly requested by the student, who wish to improve the grade gained through the written exam.<br><br>Final grade is on a scale going from 18 to 30 points, and arise from a weighted mean of  final grades in written and oral exam, with weights of respectively 70% and 30%.<br>Assessment scale:<br>30 - 30 cum laude<br>a) advanced knowledge of the fields of work or study, involving a critical understanding of theories, principles and methods of the discipline;<br>b) advanced skills, demonstrating mastery and innovation, required to solve complex and unpredictable problems in a specialised field of work or study;<br>c) fully adequate use of specialized language;<br>d) take responsibility for managing and innovate the study field.<br><br>26-29<br>a) comprehensive, specialised knowledge within the fields of work or study and an awareness of the boundaries of that knowledge;<br>b) a comprehensive range of cognitive and practical skills required to develop creative solutions to abstract problems;<br>c) comprehensive use of specialized language;<br>d) exercise management and supervision in contexts of work or study activities.<br><br>22 - 25<br>a) knowledge of principles, processes and general concepts, in a field of work or study. |

| | b) basic skills required to accomplish tasks and solve problems by selecting and applying basic methods, tools, materials and information;<br>c) basic capacity to use specialized language;<br>d) basic capacity to take responsibility for completion of tasks in work or study.<br><br>18-21<br>a) basic general knowledge;<br>b) basic skills required to carry out simple tasks;<br>c) basic capacity to communicate relevant information;<br>d) basic capacity to take responsibility for completion of tasks in work or study.<br><br>0-17<br>a) Insufficient general knowledge;<br>b) Insufficient skills required to carry out simple tasks;<br>c) Insufficient capacity to communicate relevant information;<br>d) Insufficient capacity to take responsibility for completion of tasks in work or study. |
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| **EDUCATIONAL OBJECTIVES** | Statistics shows its utility in several occasions during job activities and every day life. Statistics is useful to face choice problems  (e.g. buying, investing); to make oneself a personal informed opinion, relying on evidence instead of limited personal experience; to participate in social and political life; to control action of public power; to analyse and monitor management processes; to evaluate the feasibility and efficacy of policies; and to many other purposes.<br>This introductory course in Statistics was built to provide students with the basic statistical toolbox, in order to make them understand and manage statistical data commonly occurring during the job activities related to this degree professional outcomes.<br>The whole course adopts a pragmatic approach: lectures and tutorials are constantly integrated and the emphasis is on the usefulness and interpretation of measures and indexes rather than on their mathematical formalization. Lectures, computer lab sessions and tutorials both aim at developing awareness toward statistical data and to guide students toward their appropriate use and representation. The course aims at highlighting potentialities of elementary (descriptive) statistics to understand collective phenomena. Students are stimulated to find appropriate statistical instruments to solve simple decisional problems and evaluation tasks via quantitative analysis of qualitative and quantitative data. |
| **TEACHING METHODS** | The course is based on lectures, tutorials and computer lab sessions (use of Excel-like software). During lectures and tutorials, students are constantly invited to answer simple theoretical and practical questions using the statistical reasoning and stimulated to solve simple tasks and research related to the topics of the course by themselves.<br><br>Last 3 lectures are devoted to a simulation of the written exam (mock exam) and  to its subsequent full explanation and discussion. This simulation is an anonymous assignment and it does not concur to the final grade of the exam. Indeed the mock exam provides students an opportunity of self-evaluation of their own level of understanding. Its correction gives to the teacher and the students the opportunity to detect topics not fully clear for students so that they could be better clarified and examined in depth. |
| **SUGGESTED BIBLIOGRAPHY** | Il programma del corso e' rintracciabile nei capitoli indicati per ciascuno dei seguenti manuali:<br>1) Borra S., Di Ciaccio A. (2014), Statistica: Metodologie per le scienze economiche e sociali - Terza edizione. McGraw-Hill<br>(capitoli da 1 a 8 e capitolo 16 per le parti riportate in programma)<br>2) Agresti A., Finlay B., Statistica per le scienze sociali, Pearson-Paravia, Edizione italiana del 2009 (solo capitoli 8 e 10).<br><br>In alternativa al testo 1) gli studenti possono anche riferirsi al testo:<br>3) Cicchitelli G., D'Urso P., Minozzo M., Statistica: principi e metodi. Terza edizione. Pearson editore<br><br>Al termine di ogni capitolo dei libri indicati ci sono esercizi proposti che aiuteranno lo studente nella preparazione all'esame. E' consigliato l'uso di un testo con esercizi svolti. Tra i molti disponibili presso le biblioteche di Ateneo, ad esempio, Fraire M, Rizzi A. (2001) Esercizi di statistica. Carocci editore.<br><br>Per la parte del corso relativa agli Indicatori compositi sara' fornito specifico materiale didattico accessibile on line agli iscritti al corso tramite portale.unipa.it, sezione materiale didattico del corso. |

# SYLLABUS

| Hrs | Frontal teaching |
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| 2 | Introduction: syllabus, aims and grading of the course. Definitions of population and sample. The Stevens' classification of the variables. Continuous and discrete variables. Frequency distributions. |
| 2 | Frequencies: absolute, relative, cumulative, percentual. The arithmetic mean and the mode on frequency distributions. |
| 2 | Mean and mode on grouped frequency distributions. Merits and demerits of arithmetic mean. |
| 2 | Computation of the median in frequency and grouped frequency distributions (median class). Merits and demerits of median. Quantiles (quartiles, quintiles, deciles, percentiles). |
| 2 | Geometric mean: computation and interpretation. When is it useful? |
| 2 | Graphical representations: pie charts; bar charts; histograms (equal/different width classes). Plot of time series and spatial data. |
| 2 | Introduction to the notion of variability for quantitative and qualitative variables. Range and standard deviation. |
| 2 | Use and interpretation of the standard deviation. Variance and coefficient of variation. |
| 2 | Interquartile range. Measuring variability of qualitative variables: the heterogeneity index of Gini. The notion of asymmetric distribution. A plot for variability and asymmetry: box-plot. |
| 4 | Statistical ratios: Composition, derivation, co-existence, and duration ratios. Fixed base relatives, chain relatives (simple index numbers); Variation rate; Mean variation; average growth rate. Trend variations and short-term varitions. Some examples on common statistical ratios and rates. |
| 4 | Introduction to bivariate statistical analysis. Cross-classifications, two way tables. Joint, marginal and conditional distributions. Row, column and cell percentages. |
| 2 | Logical dependence and independence. Statistical dependence and independence. Interdependence. Analysing conditional distributions on two-way tables. |
| 2 | Introduction to the notion of probability. Events and probability space. Classical and frequentist probability. Probability postulates. Conditional probabilities and independence. |
| 2 | Bivariate analysis - Indexes of association for categorical variables: chi-squared; Cramer index (V), Yule's index (Q). Concordance and discordance between ordinal categorical variables |
| 2 | Bivariate analysis - Association for ordinal variables: Spearman rank correlation coefficient; Goodman and Kruskal's gamma ordinal correlation. |
| 2 | Bivariate analysis on 2 by 2 tables: proportions comparison; odds; odds ratio. Properties and interpretation of odds ratios. Relative risk. |
| 4 | Bivariate analysis for quantitative variables: scatter diagram, covariance; correlation coefficient, properties and interpretation of the correlation coefficient. |
| 2 | Bivariate analysis for quantitative variables - Ordinary least squares regression. Estimation and interpretation of the parameters of the regression line: geometrical and statistical meaning. Plot the regression line. Goodness of fit statistics. |
| 5 | Statistical indexes and indicators. The rationale of composite indicators. An introduction on how to build and use composite indicators. Some examples of composite indexes of socio-economic development (human development index, perception of corruption index; multiple deprivation index). |
| 2 | Multivariate analysis. Causality and association. Confounding, intervening, and suppressing variables. Spurious association. Causal chains. |

| Hrs | Practice |
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| 2 | Tutorial on tendency and variability measures. |
| 2 | Mock (written) exam. |
| 4 | Tutorial: Solutions of mock exam and discussion. |

| Hrs | Workshops |
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| 3 | Excel lab (tutorial): managing data matrix; building and analysing frequency distributions and twoway tables; choosing and making the appropriate graphs. |
| 3 | Tutorial on regression line and linear correlation. Linear regression using Excel. |