

Course Descriptions:**Undergraduate Certificate Program in Data Visualization and Analysis****Visualization and Cognition****DAVA 3000 Data Visualization**

Visualization is crucial for understanding complex information and for enabling humans to act on information appropriately. For example, visualization is used in many application areas such as social and health sciences, business, the natural sciences and engineering. This course introduces the foundations of information visualization rooted in cognitive psychology and perception. This course also teaches retrieving information from data sources, such as data bases and the internet, preparing data for processing, as well as creating and presenting information visualizations using standard software. Corequisite: PSYC 3214. *3 credits*

PSYC 3214 Cognitive Processes

Examination of theory and research on the mental processes that characterize thought, including imagery, language, attention, memory, reasoning and problem solving, with discussion of the simulation of mental behaviors. Prerequisite: minimum grade of C- in PSYC 1101. *3 credits*

Data Analysis**DAVA 3010 Data Mining**

This course introduces the foundations of applied data mining. There is a need for extracting useful information from raw data in fields such as social and health sciences, business, the natural sciences and engineering. This course covers the fundamental ideas and algorithms of data mining. Furthermore, it teaches applying data mining techniques in order to extract useful information from data. Standard software for data mining will be used. The course is intended for any student desiring an introduction to data mining. Prerequisites: MATH 0012 or appropriate placement. *3 credits*

MATH 1203 Statistical Models for the Social Sciences

Applications of statistics in the social sciences. Analysis and interpretation of statistical models. Sampling techniques, common flaws and errors in sampling and in using statistics. Descriptive statistics, levels of measurement, measures of central tendency and dispersion. Contingency tables and measures of association for categorical variables. Correlation and linear regression. Probability and frequency distributions. Parametric and nonparametric inferential statistics. Confidence intervals and hypothesis testing. Prerequisite: MATH 0012 or appropriate placement. *3 credits*

Alternatives to MATH 1203:**BQUA 2811 Business Statistics**

This course provides students with an understanding of statistical techniques for analyzing business problems. Concepts are developed using calculations for simple problems with small amounts of data. Larger and more realistic problems are handled using Microsoft Excel. Topics include descriptive statistics, elements of probability, sampling, interval estimation, hypothesis testing and regression analysis. Prerequisite: MATH 1303. Offered: Fall, Spring, Summer. *3 credits*

CHEM 4212 Statistics and Applied Analytical Chemistry

Principles of experimental design, statistics and analysis of data. Principles of data acquisition and interpretation and other aspects of applied analytical chemistry. *3 credits*

MATH 2111 Statistics for Science Majors

Oriented toward direct application to research problems in the sciences. Collecting and organizing data, design of experiments, standard distributions, statistical tests and procedures used in hypothesis testing. A discursive treatment of the probability theory necessary to understand statistical tests is included but minimized. Emphasis on statistical inference and developing an awareness of statistical methods in a given situation. Prerequisite: MATH 1401. 4 credits

MATH 3711-3712 Statistical Analysis I and II

Probability spaces, random variables, sampling, the law of large numbers, central limit theorem, confidence intervals and tests of hypotheses, regression, statistical decision theory, sampling from a normal population, testing hypotheses, experimental design and analysis of variance. Other sampling methods. Prerequisites: MATH 1611, MATH 2511. 3 credits each

PSYC 2311 Elementary Psychological Statistics

Descriptive and inferential statistics in the design and interpretation of experimental data. Includes computer laboratory. Prerequisites: minimum grade of C- in PSYC 1101 and MATH 1202. 4 credits

Practical Experience**DAVA 4011 Intern in Visual Analytics**

This course provides credit for students participating in an internship experience through the Career Center. As part of the requirements, students are required to give a presentation about their experience in the departmental seminar. Students interested in the internship experience are required to consult the departmental internship adviser.

Elective Courses**AART 1223 2-D Design and Color**

Development of visual literacy with regard to the ability to construct, interpret and verbalize the concepts involved in image making. Concepts covered will relate to all fields in the visual arts. Examples of fine and applied art will be analyzed using the principles and elements of two dimensional design and color theory. 3 credits

BITM 2701 Management Information Systems

Role of technology in the management process. Introduction to the basic concepts of computer hardware and software. A significant part of the course deals with the use of Windows applications, spreadsheets, database, word processing and Internet-related tools. Emerging ethical issues in technology are treated. Offered: Fall, Spring. 3 credits

BITM 3727 Advanced Business Software Tools

This course will teach advanced topics in spreadsheet (Excel) design/programming. The course will show students how to use Visual Basic for Applications (VBA) to build functionally rich spreadsheets. In addition, the course will show how VBA can also be used with a database tool (Access) for building user-friendly applications. Prerequisite: BITM 2701 or permission of the instructor. Offered: Fall, Spring. 3 credits

BMIE 3716 Access Database Application Development

Learn to manage information using a relational database. Gain the knowledge and expertise to develop simple to complex queries, data entry forms and reports. Database design and the importance of referential integrity are stressed. 3 credits

COGR 3323 Presentation Graphics

Introduction to communication of information through visual symbols, including charts and graphics. Presentation, business and information graphics are taught within the context of professional and ethical standards using professional computer systems and software. 3 credits

CSAS 4115 Databases

Modern relational databases. Relational algebra, views and queries, normal forms and normalization, tuning and optimization. The entity-relationship model and database design. Overview of other approaches, especially object-oriented databases, data warehouses and data mining, distributed databases and very large applications. Group project, both design and implementation, in an SQL-based environment, such as Access or Oracle. Prerequisites: CSAS 2124, 2126, MATH 1611 or permission of department chair. 3 credits

Prerequisite in Psychology**PSYC 1101 Introduction to Psychology**

Survey of the major content areas of psychology, including physiological, perception, motivation, learning, cognition, personality, developmental, abnormal and social. 3 credits