

# UNOFFICIAL DEGREE PLAN WORKSHEET

## University of North Texas College of Information Bachelor of Science Data Science

Name: \_\_\_\_\_  
 Address: \_\_\_\_\_  
 Phone Number: \_\_\_\_\_  
 E-mail: \_\_\_\_\_

Date: \_\_\_\_\_ Catalog Year: 2023-2024

University Core: 42 Semester Hours (* = best selection)			
UNT Course	Transfer Course	College	S.H.
COMMUNICATION (6 HRS.) C or better			
ENGL 1310			3
ENGL 1320			3
MATHEMATICS (3 HRS.)			
MATH 1680*			3
LIFE & PHYSICAL SCIENCES (6 HRS.)			
LAB SCIENCE			3
LAB SCIENCE			3
CREATIVE ARTS (3 HRS.)			
			3
LANGUAGE, PHILOSOPHY, & CULTURE (3 HRS.)			
			3
AMERICAN HISTORY (6 HRS.) or adv. U.S. HIST			
HIST 2610			3
HIST 2620			3
GOVERNMENT / POLITICAL SCIENCE (6 HRS.)			
PSCI 2305			3
PSCI 2306			3
SOCIAL & BEHAVIORAL SCIENCE (3 HRS.)			
ECON 1110 *			3
Component Area Category I - Discovery (3 HRS.)			
COMM 1010*			3
Component Area Category II - Capstone (3 HRS.)			
Substitute Course			3
Total University Core Hours:			

-A grade of "C" or higher is required in all Pre-Data Science, Major Courses, and Professional Field courses.  
 -A 2.0 UNT, 2.0 Overall, and 2.7 Professional Field GPA is required for graduation.  
 -The student must request an official degree plan in the COI advising office, [CI-Advising@unt.edu](mailto:CI-Advising@unt.edu)

Pre-Data Science Requirements (15 Hrs.)	
A grade of C or higher	
Math 1650 Pre-Calculus (MATH 1100)	5
MATH 1680 Elementary Probability and Statistics	3
CSCE 1030 Computer Science I (MATH 1650)	4
CSCE 1040 Computer Science II (CSCE 1030, MATH 1710)	3
Data Science MAJOR COURSES (24 Hrs.)	
A grade of C or higher	
DTSC 3010 Intro. to Data Science (MATH 1650, CSCE 1030)	3
DTSC 3020 Introduction to Computation with Python	3
DTSC 4501 Principles of Data Science and Analytics (3020)	3
DTSC 4050 Statistical Methods for Data Science & Analysis	3
INFO 4670 Data Analysis and Knowledge Discovery	3
INFO 4707 Data Modeling and Data Warehousing	3
INFO 4730 Digital Curation and Preservation	3
INFO 4709 Data Visualization	3
Professional Field (24 Hrs.)	
A grade of C or higher & 2.7 GPA or higher	
Information Science	Business Analytics
INFO 4080	DSCI 2710
INFO 4203	DSCI 3710
INFO 4206	BCIS 3610
INFO 4230	DSCI 3870
INFO 4306	DSCI 4510
INFO 4307	DSCI 4520
INFO 4365	DSCI 4330
INFO 4745	DSCI 4700
Related Electives (15 hrs.)	
Advanced courses in a related field such as computer science, statistics, business analytics, digital communications analytics, health data analytics, and education analytics.	
1. MATH 1710	3
2.	3
3.	3
4.	3
5.	3
*INFO 3901 Data Science Internship Project can be used as related elective course	
*Math 1710, 1720, 2700, and 3680 are prerequisites for MSDS, UNT.	

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**DTSC 3010 – Introduction to Data Science** – This course introduces the to student concepts, principles, topics, technologies, and the profession of data science. Students study and understand different types of data and how data can be acquired, stored, organized, analyzed, and presented to meet a variety of needs on data products. Assignments and the term project allow students to handle real-world data challenges. Students learn to use data to answer questions and make informed decisions. The course will explore natural language processing, databases, financial modeling, statistical analysis, social network analysis, and data visualization. Ethical issues regarding data science process are also discussed. Prerequisite(s): None.

**DTSC 3020 – Introduction to Computation with Python** – Python is a language with a simple syntax and a powerful set of libraries. It is an interpreted language, with a rich programming environment, including a robust debugger and profiler. While it is easy for beginners to learn, it is widely used in many scientific areas for data exploration. This course is an introduction to the Python programming language for students without prior programming experience. Data types, control flow and introduction to the analysis of program performance are covered. Real-world data from various areas are used as examples to demonstrate how to process and analyze these data with Python. Prerequisite(s): None.

**INFO 4080 – Research Methods and Evaluation** – Research principles and techniques; role of theories and hypotheses; experimental and non-experimental research; measurement and data collection; analysis and interpretation; quantitative methods and applications; problems in formulating research proposals and evaluating representative studies. 3 hours; Prerequisite(s): None.

**INFO 4203 – Information Indexing and Organization** – Applications in different types of information systems of text documents, images or audio files. Use of database retrieval software to store and represent information. Indexing formulation, automatic programming, and design for user support. Planning and implementing multimedia documents. 3 hours; Prerequisite(s): None.

**INFO 4206 – Information Retrieval Systems** – Computer-based storage and retrieval of textual, pictorial, graphic and voice data. Addresses questions about how users interact with information retrieval (IR) systems, their components, evaluation and their impact in society. The issues of representation, the nature of the query, and other aspects of the system are examined. 3 hours; Prerequisite(s): None.

**INFO 4210 – Information Organization and Records Control** – Descriptive cataloging, subject analysis, classification and control of information resources of all kinds; Anglo-American Cataloguing Rules; Dewey Decimal and Library of Congress classification systems; subject headings; organization, functions and use of catalogs and classification systems; principles of information indexing and retrieval; use of bibliographic databases; representative problems and practice. 3 hours; Prerequisite(s): Consent of Department.

**INFO 4223 – Metadata and Networked Information Organization** – Representation, organization and retrieval of networked information resources (NIR) using various forms of metadata. Examination and evaluation of key metadata schemes for representing and organizing NIR. Identification and use of metadata creation tools to build and manage metadata repositories. Explore implications for retrieval of NIR through search engines that exploit metadata. 3 hours; Prerequisite(s): INFO 4203 or Consent of Department.

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**INFO 4230 – Records Management Operations** – Management operations for records control and use; preparation, organization, storage, retrieval and dissemination. Preservation, security and disposal problems. Planning and supervising records management programs. Departmental functions and organization. Data-processing applications and online systems. 3 hours; Prerequisite(s): None.

**DTSC 4050 – Statistical Methods for Data Science and Analysis** – Introduces students to both theories and applications of statistical methods. Students learn the core concepts of statistical computing and advanced techniques for data analysis, while working hands-on with real data using statistical tools. 3 hours; Prerequisite(s): None.

**INFO 4300 – Administration of Information Agencies** – Role, functions and development of principal kinds of information centers and agencies. Management principles and practices; standards and evaluation; resources and services; facilities and equipment; planning, staffing and reporting; public relations; budgeting and financial procedures; policy making; social contexts and backgrounds; professional perspectives. 3 hours; Prerequisite(s): None.

**INFO 4306 – Project Management for Information Systems** – Managing the process of planning, developing, implementing and evaluating systems, including defining requirements, developing requests for proposals, evaluating alternative systems, and locating and hiring consultants. 3 hours; Prerequisite(s): None.

**INFO 4307 – Knowledge Management Tools and Technologies** – Introduction to knowledge management technologies; Internet and web technologies; knowledge management processes and corresponding technologies; collaboration tools and technologies; information and knowledge portals; KM readiness and IT infrastructure; evaluation and selection criteria for knowledge management tools. 3 hours; Prerequisite(s): None.

**INFO 4365 – Health Sciences Information Management** – Introduction to computer-based health sciences information centers. Topics include: health sciences environment, management, collections, users, project planning, information technology, evaluation and assessment, professional activities of health information management specialists, including the growing emphasis on evidence-based practice, informatics, and trends that affect future practice. 3 hours; Prerequisite(s): None.

**INFO 4400 – Evaluation and Development of Information Resources** – Principles and techniques of selecting and acquiring information resources of all kinds; development and maintenance of collections; criteria and selection aids; national and trade bibliographies; online searching; publishers and publishing; censorship problems and intellectual freedom; representative problems and practice. 3 hours; Prerequisite(s): None.

**INFO 4420 – Information Resources for Children** – Survey of print and non-print materials, including multicultural/multiethnic materials; utilization practices and selection; curricular correlations and enrichment; recreational and developmental needs; children's services and programs; wide reading and use of literature and other materials for children from preschool through middle-school years. 3 hours; Prerequisite(s): None.

**INFO 4430 – Information Resources for Young Adults** – Survey of print and non-print materials, including multicultural/multiethnic materials; utilization practices and selection; curricular correlations and enrichment; recreational and developmental needs; young adult services and programs; wide reading and use of literature and other materials for young adults from upper middle school through high school years. 3 hours; Prerequisite(s): None.

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**DTSC 4501 – Principles of Data Science and Analytics** – Introduction to the fundamentals of data science and data analytics. It provides the required foundational knowledge and practice to students to successfully integrate automatic methods and tools for qualitative and quantitative analysis. Other topics include CRTSP–DM, SEMMA, data assurance, policy, ethics, privacy and security, principles and practice of technical, statistical, and human behavior, as well as social and professional issues related to the handling of data. 3 hours; Prerequisite(s): None.

**INFO 4615 – Electronic Information Services** – Basic concepts of electronic information services and databases in different fields; conducting online searches and evaluating services. Supervised practical experience. 3 hours; Prerequisite(s): None.

**INFO 4620 – Information Resources in the Humanities** – Information resources, methods and services to meet access needs in the humanities. Literature searching and communication patterns in individual fields. Role of professional organizations and government. Representative problems and practice. 3 hours; Prerequisite(s): None.

**INFO 4630 – Information Resources in Sciences and Technology** – Information resources, methods and services to meet access needs in science and technology. Literature searching and communication patterns in individual fields. Role of professional organizations and government. Representative problems and practice. 3 hours; Prerequisite(s): None.

**INFO 4637 – Medical Informatics** – History of medical information. Biomedical communication. Types of information resources and services related to the transfer of information in the health sciences. Computer applications to health sciences libraries. Analyses of current issues in the health care field and their relationship to health sciences libraries and information centers, ethics, confidentiality and security. 3 hours; Prerequisite(s): None.

**INFO 4646 – Information Resources in Business** – Information resources, methods and services to meet access needs of business as a discipline and in practice. Characteristics of information services to a specific, diverse user community. Introduction to and development of print and electronic forms of information relevant to the business community's information needs. 3 hours; Prerequisite(s): None.

**INFO 4670 – Data Analysis and Knowledge Discovery** – Introduces the student to data analysis, data mining, text mining and knowledge discovery principles, concepts and practices to approach data and data mining tasks and techniques using suitable software and other data analysis tools. Covers principles and theories of data mining and text mining techniques as well as analytical applications of data mining and knowledge discovery tools. 3 hours; Prerequisite(s): None.

**INFO 4685 – Information Resources in Culturally Diverse Communities** – Information resources, methods and services to meet access needs of ethnic cultural minorities. Issues in the provision of information services to ethnic cultural minority communities. Study of the needs and cultural milieu of these communities. Materials and methods for serving these groups. 3 hours; Prerequisite(s): None.

**INFO 4707 – Data Modeling and Data Warehousing** – Introduction to traditional linear and relational database theory and practice. The main focus is on modern approaches that include SQL and NoSQL, graph-based databases for structured and unstructured datasets, and standards for data representation, exchange and modern computer-based processing related to the data lifecycle. 3 hours; Prerequisite(s): None.

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**INFO 4710 – Information Technology Management** – Basic concepts of information and its role in an information society. Includes mechanisms of information processing, information transfer, and applications of computers and other information tools in various disciplines and fields. 3 hours; Prerequisite(s): None.

**INFO 4730 – Digital Curation and Preservation** – The abundance of electronic and computer-based information requires a new type of professional to examine the life-cycle of the new type of information content: digital content. Decisions about the preservation of this new type of material are not trivial, and include its descriptive components and particular formats and standards for long term archival storage and access. This course is about the tools and techniques to accomplish these goals. 3 hours; Prerequisite(s): None.

**INFO 4745 – Information Architecture** – Introduces the basic concepts and components of information architecture within the context of end-user and organizational needs. Provides an understanding of the intellectual technologies necessary to design and implement effective and cost-efficient information systems such as digital libraries, database systems, and a range of other web-accessible resources, as well as collaborative computer systems in organizational environments. Students conduct a collaborative term project to design and implement a real-world system integrating the knowledge and skills learned on organization of information, visual design, human interface and usability issues. 3 hours; Prerequisite(s): None.

**INFO 4709 – Data Visualization** – Introduction to data visualization covering the design and evaluation of visual data, including acquisition, parsing, and analysis. It will enable students to combine statistical approaches, computer treatment, and graphic methods to examine structured and unstructured data. Students will learn different techniques and computer tools to visualize large datasets, discover hidden information and be able to answer research questions. 3 hours; Prerequisite(s): None.

**INFO 4910 – Special Problems** – Supervised individual or small-group study of special problems or topics not otherwise covered by regular course offerings. 1-3 hours; Prerequisite(s): Consent of instructor and chair of the department. May be repeated for credit as topics vary.

**INFO 4970 – Information Science Seminar** – Supervised individual or group work on current issues of modern technology and information science. 3 hours; Prerequisite(s): Consent of instructor and chair of the department. May be repeated for credit as topics vary.

**MATH 1190 – Business Calculus** (MATH 1325 or MATH 1425) 3 hours

Differential and integral calculus with emphasis on applications to business.

Prerequisite(s): Two years of high school algebra and consent of department; or [MATH 1100](#) or [MATH 1180](#) with a grade of C or better.

**MATH 1680 – Elementary Probability and Statistics** (MATH 1342 or MATH 1442 or MATH 2342 or MATH 2442)

Introductory course to serve students of any field who want to apply statistical inference. Descriptive statistics, elementary probability, estimation, hypothesis testing and small samples.

Prerequisite(s): TSI complete.

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### **MATH 1650 – Pre-Calculus** (MATH 2312 or MATH 2412) 5 hours

Preparatory course for calculus: trigonometric functions, their graphs and applications; sequences and series; exponential and logarithmic functions and their graphs; graphs of polynomial and rational functions; general discussion of functions and their properties.

Prerequisite(s): [MATH 1100](#) with a grade of C or better.

MATH 1650 covers approximately the same material as [MATH 1600](#) and [MATH 1610](#) together. Students who already have credit for both [MATH 1600](#) and [MATH 1610](#) may not receive credit for MATH 1650.

### **MATH 1710 – Calculus I** (MATH 2313 or MATH 2413 or MATH 2513) 4 hours (3;0;2)

Limits and continuity, derivatives and integrals; differentiation and integration of polynomial, rational, trigonometric, and algebraic functions; applications, including slope, velocity, extrema, area, volume and work.

Prerequisite(s): A grade of C or higher in [MATH 1650](#); or a grade of C or higher in both [MATH 1600](#) and [MATH 1610](#).

### **MATH 1720 – Calculus II** (MATH 2314 or MATH 2414), 3 hours

Differentiation and integration of exponential, logarithmic and transcendental functions; integration techniques; indeterminate forms; improper integrals; area and arc length in polar coordinates; infinite series; power series; Taylor's theorem.

Prerequisite(s): A grade of C or higher in [MATH 1710](#).

### **MATH 2700 – Linear Algebra and Vector Geometry** (MATH 2318 or MATH 2418), 3 hours

Vector spaces over the real number field; applications to systems of linear equations and analytic geometry in  $E_n$ , linear transformations, matrices, determinants and eigenvalues.

Prerequisite(s): A grade of C or higher in [MATH 1720](#).

### **MATH 3680 – Applied Statistics**, 3 hours

Descriptive statistics, elements of probability, random variables, confidence intervals, hypothesis testing, regression, contingency tables. Prerequisite(s): [MATH 1710](#) and [MATH 1720](#)

### **CSCE 1030 – Computer Science I** (COSC 1336 or COSC 1436) 4 hours (3;1)

Introduction to computer science and engineering, problem-solving techniques, algorithmic processes, software design and development. Prerequisite(s): [MATH 1650](#) with a grade of C or better.

### **CSCE 1040 – Computer Science II** 3 hours (2;3)

Continuation of [CSCE 1030](#). Software design, structured programming, object-oriented design and programming. Prerequisite(s): [CSCE 1030](#). Corequisite(s): [MATH 1710](#).

### **BCIS 2610 – Introduction to Computers in Business** (BCIS 1305 or BCIS 1405)

Study of the introductory concepts of computing in business; basic computer components, computer history and programming. Prerequisite(s): [MATH 1100](#) or higher ([MATH 1180](#) preferred).

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### **DSCI 2710 – Data Analysis with Spreadsheets**

Collection, description and analysis of numerical data. Data presentation, tables, charts and graphs, descriptive statistics, analysis of time series and index numbers, sampling techniques and distributions, estimation, confidence intervals, with applications in quality control and productivity.

Prerequisite(s): Must have completed two years of high school algebra and one year of geometry and be eligible for college level math course.

### **DSCI 3710 – Business Statistics with Spreadsheets**

Statistical inference for means and proportions, analysis of variance, correlation, simple and multiple regression. Extensive use of cases and spreadsheets.

Prerequisite(s): [DSCI 2710](#) with a grade of C or better.

### **BCIS 3610 – Basic Information Systems**

Theory, capabilities, applications, benefits, liabilities and economics of business computer information systems. Using the computer to solve business problems. Management information systems and computer-based decision support emphasized. Use of standard support application packages.

Prerequisite(s): [BCIS 2610](#) or equivalent.

### **DSCI 3870 – Management Science**

Introduction to operations research for business decision making. Spreadsheet methods are used to evaluate the following: deterministic models; allocation problems, linear programming, sequencing and scheduling, and network models.

Prerequisite(s): [ECON 1100](#), [ECON 1110](#), [MATH 1100](#), [DSCI 2710](#) or consent of instructor; [ACCT 2010](#) and [ACCT 2020](#) with grades of C or better; [MATH 1190](#) or equivalent.

### **DSCI 4510 – Modeling for Business Intelligence**

How modeling for business intelligence systems can be utilized as a key element within a managerial decision process. Attention is paid to how and why such a model is used in a BI support system environment. Topics include the use of mathematical, statistical and business models that are both structured and semi-structured decision problems.

Prerequisite(s): [DSCI 3870](#), [BCIS 3610](#). 2.7 UNT GPA (2.7 transfer GPA if no courses taken at UNT); a grade of C or better in each previously taken DSCI course.

### **DSCI 4520 – Introduction to Data Mining**

Knowledge discovery in large databases, using data mining tools and techniques. Topics include data exploration, modeling and model evaluation. Decision making in a case-embedded business environment is emphasized.

Prerequisite(s): [DSCI 3710](#), [BCIS 3610](#). 2.7 UNT GPA (2.7 transfer GPA if no courses taken at UNT); a grade of C or better in each previously taken DSCI course.

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### **DSCI 4330 – Enterprise Applications of Business Intelligence/Analytics**

Current issues in the utilization of business intelligence/analytics (BI/A) in organizations. Topics include the concepts, methodologies and tools to efficiently and effectively implement BI/A endeavors. The focus is on understanding how BIA is needed and used in organizations today and understanding how to resolve the often conflicting variety of BI/A offerings. Emphasis is placed on current and future directions of BI/A as relevant to projects underway in organizations across all levels of their value chains.

Prerequisite(s): [BCIS 2610](#) or equivalent; [DSCI 2710](#) or equivalent; and 2.7 UNT GPA (2.7 transfer GPA if no courses taken at UNT).

### **DSCI 4700 – Analytics for Decision Making**

Study of the analytics that underlie the process of decision-making and the information requirements of decisions; decision support tool selection, process improvement and applications development.

Prerequisite(s): [BCIS 4660](#) or [ACCT 4100](#) or [LSCM 3960](#); 2.7 UNT GPA (2.7 transfer GPA if no courses taken at UNT); a grade of C or better in each previously taken DSCI course.

### **Recommended Electives, 15 hours**

Students may choose 5 courses from the list below, or courses in a related field such as computer science, statistics, business analytics, digital communications analytics, health data analytics, and education analytics.

- INFO 4970 – Information Science Seminar \*
- BCIS 3615 – Visual Display of Business Information
- BCIS 3630 – Object-Oriented Programming for Business
- BCIS 3680 – Enterprise-Oriented Programming
- BCIS 4610 – Analysis of Business Information Systems
- BCIS 4620 – Introduction to Database Applications
- BCIS 4630 – Fundamentals of Information Technology Security
- BCIS 4660 – Introduction to Data Warehousing
- BCIS 4690 – Information Technology Management
- BCIS 4720 – Web-Based Information Technologies
- MATH 1710 – Calculus I (Required course in MSDS program)
- MATH 1720 – Calculus II(Required course in MSDS program)
- MATH 2700 – Linear Algebra and Vector Geometry (Required course in MSDS program)
- MATH 3680 – Applied Statistics

**\* required course for those students who wish to complete an internship or CPT**

A grade of "C" or higher is required in all Pre-Data Science, Major Courses, Professional Field, and Supporting Field courses.

A 2.0 UNT, 2.0 Overall, and 2.7 Professional/Supporting Field GPA is required for graduation.

<https://informationscience.unt.edu/bs-data-science-program-requirements>