North Central College – Fall 2024
Course Syllabus for INFS 110 – Data Analysis, Modeling and Presentation

Instructor:	Clinton Garwood
Course Time:	Tuesday, Thursday 3:35 - 5:00PM, Wentz Room 156
Course Dates:	8/22/2023 - 12/6/2024
Email:	cgarwood@noctrl.edu
Course Material:	https://canvas.noctrl.edu/courses/9096
Office:	Wentz Faculty Center, Room 113
Academic Detail:	CD Quant Analysis; Full Semester Session.
	Credits 4.00, Academic Level UG – Undergraduate

Course Description:

Use of computing tools and techniques for data modeling, analysis, visualization and presentation. Topics include introduction to spreadsheet tools for data processing, presentation and analysis of quantitative and qualitative data, statistical and financial functions, formulas, graphical and modern visualization tools, macros and scripting; Introduction to modeling and simulation, scenarios and goal-seeking and what-if analysis. Students are encouraged to align presentations towards practical applications such as climate data, personal wellness/fitness modeling, financial problems, etc.

Optional Textbook:

Excel Data Analysis and Business Modeling, Seventh Edition (Office 2021 and Microsoft 365).

ISBN 9780137613663 by Wayne L Winston

Coursework and Grades:

Points accumulated by the soon to be described assignments and participation exercises are given a letter rank by the college in the following proportions:

100-93% A, 92-90 A-, 89-87 B+, 86-83 B, 82-80 B-, 79-77 C+, 76-73 C, 72-70 C, 69-60 D, 59 and below F

Course Format:

The primary activities in each class will be:

1. Skills Demonstrations, Technical Discussions Proficiency
2. Knowledge Documentation and Technical Resource Mastery
3. Interactive Participation, Peer Review
3. Team Work (small groups)

Assignments:

All materials (presentation materials, excel spreadsheets, videos, artifact updates, etc.), must be submitted via canvas. All presentations and participations are peer-reviewed (live during class).

Point-Bearing Components

16 points	Participation
3 points	Skills Presentation
3 points	Portfolio Presentation
4 points	Group Work
5 points	AI Research

There are a total of thirty-one (31) assignments, which includes sixteen (16) participation experiences, three (3) skills demonstrations, three (3) portfolio presentations, four (4) group work assignments and five (5) AI research assignments. All assignments are worth 1 point.

There are **no make-up opportunities, no late submissions accepted**, or extra credit of any kind.

Each student can claim two (3) exemptions for personal or other reasons. Students do not need to declare in advance when they elect to use their exemptions and will never be asked the reason. The student **does** need to notify me that they want to apply their exemption so the gradebook can be updated to correct the otherwise zero auto-score for those assignments.

Dean approved and other college-authorized exemptions (i.e., competitions, showcases) must be presented for each date in writing from the validating source. These college-exempted days do not reduce the number of personal days available for exemption.

Participation:

Attendance is not participation, and in a Socratic method learning environment (we do not debate) each student (peer) is required to be mentally present in class and actively engaged in each topic(s).

Students are not allowed to work on homework in class, browse or consume any media or outside content during the class. Our small class size makes feasible a distributed learning component which involves students both consuming micro presentations made by their peers, and also presenting a micro presentation to their peers.

Proposed Course Schedule

WEEK	SUBMISSONS	MATERIAL	RELATED READING
1	8/23	Week 1 Topics	Winston 7th ed (Chaps 1, 2)
2	8/28, 8/30	Week 2 Topics	Winston 7th ed (Chaps 3 - 7)
3	9/6	Week 3 Topics	Winston 7th ed (Chaps 8 - 10)
4	9/11, 9/13	Week 4 Topics	Winston 7th ed (Chaps 11 - 16)
5	9/18, 9/20	Week 5 Topics	Winston 7th ed (Chaps 17 - 21)
6	9/25, 9/27	Week 6 Topics	Winston 7th ed (Chaps 22 - 27)
7	10/2, 10/4	Week 7 Topics	Winston 7th ed (Chaps 28 - 33)
8	10/9, 10/11	Week 8 Topics	Winston 7th ed (Chaps 34 - 39)
9	10/16, 10/18	Week 9 Topics	Winston 7th ed (Chaps 40 - 46)
10	10/23, 10/25	Week 10 Topics	Winston 7th ed (Chaps 47 - 53)
11	10/30, 11/1	Week 11 Topics	Winston 7th ed (Chaps 54 - 62)
12	11/6, 11/8	Week 12 Topics	Winston 7th ed (Chaps 63 - 69)
13	11/13, 11/15	Week 13 Topics	Winston 7th ed (Chaps 70 - 75)
14	11/20	Week 14 Topics	Winston 7th ed (Chaps 76 - 78)
15	11/27, 11/29	Week 17 Topics	Winston 7th ed (Chaps 79 - 85)
16	12/4, 12/6	Week 16 Topics	Winston 7th ed (Chaps 86 - 93)

NOTE: This schedule is as complete as possible, and adjustments may be made during the term .

Proposed Topic List by Week

Week 1

- Basic worksheet modeling
- Range names

Week 2

- Lookup functions
- The INDEX function
- The MATCH function
- Text functions and Flash Fill
- Dates and date functions

Week 3

- The net present value functions: NPV and XNPV
- The internal rate of return: IRR, XIRR, and MIRR functions
- More Excel financial functions
- Circular references
- IF, IFERROR, IFS, CHOOSE, SWITCH, and the IS functions
- Time and time functions

Week 4

- The Paste Special command
- Three-dimensional formulas and hyperlinks
- The auditing tool and the Inquire add-in
- Sensitivity analysis with data tables
- The Goal Seek command
- Using the Scenario Manager for sensitivity analysis

Week 5

- The COUNTIF, COUNTIFS, COUNT, COUNTA, and COUNTBLANK functions
- The SUMIF, AVERAGEIF, SUMIFS, AVERAGEIFS, MAXIFS, and MINIFS functions
- The OFFSET function
- The INDIRECT function
- Conditional formatting

Week 6

- Excel tables and table slicers
- Spin buttons, scrollbars, option buttons, check boxes, combo boxes, and group list boxes
- Importing data from a text file or document
- The Power Query Editor
- Excel's new data types
- Summarizing data with histograms and Pareto charts

Week 7

- Summarizing data with descriptive statistics
- Sorting in Excel
- Filtering data and removing duplicates
- Summarizing data with database statistical functions
- Array formulas and functions
- Excel's new dynamic array functions

Week 8

- Validating data
- Using PivotTables and slicers to describe data
- The Data Model
- Power Pivot
- Consolidating data
- Creating subtotals

Week 9

- Basic charting
- Advanced charting
- Filled and 3D Maps
- Sparklines
- Estimating straight-line relationships
- Modeling exponential growth
- The power curve
- Using correlations to summarize relationships

Week 10

- Introduction to multiple regression
- Incorporating qualitative factors into multiple regression
- Modeling nonlinearities and interactions
- Analysis of variance: One-way ANOVA
- Randomized blocks and two-way ANOVA
- Using moving averages to understand time series
- Ratio-to-moving-average forecast method

Week 11

- An introduction to probability (word problems)
- An introduction to random variables
- The binomial, hypergeometric, and negative binomial random variables
- The Poisson and exponential random variable
- The normal random variable and Z-scores
- Making probability statements from forecasts
- Using the lognormal random variable to model stock prices
- Importing past stock prices, exchange rates, and cryptocurrency prices with the STOCKHISTORY function

Week 13

- An introduction to optimization with Excel Solver
- Using Solver to determine the optimal product mix
- Using Solver to schedule your workforce
- Using Solver to solve transportation or distribution problems
- Using Solver for capital budgeting
- Using Solver for financial planning
- Using Solver to rate sports teams

Week 14

- Winters method and the Forecast Sheet tool
- Forecasting in the presence of special events
- Warehouse location and the GRG Multistart and Evolutionary Solver engines
- Penalties and the Evolutionary Solver
- The traveling salesperson problem
- Weibull and beta distributions: Modeling machine life and duration of a project

Week 15

- Introduction to Monte Carlo simulation
- Calculating an optimal bid
- Simulating stock prices and asset-allocation modeling
- Fun and games: Simulating gambling and sporting-event probabilities
- Using resampling to analyze data
- Pricing stock options
- Determining customer value

Week 16

- The economic order quantity inventory model
- Inventory modeling with uncertain demand
- Queuing theory: The mathematics of waiting in line
- Estimating a demand curve
- Pricing products by using tie-ins
- Pricing products by using subjectively determined demand
- Nonlinear pricing
- Use Analyze Data to find patterns in your data
- Recording macros
- The LET and LAMBDA functions and the LAMBDA helper functions
- Advanced sensitivity analysis

NCC Computer Science Department Plagiarism Policy

All CS students are responsible to know and abide by the contents of this statement: https://www.northcentralcollege.edu/computer-science/departmentplagiarism-policy

"In computer science classes, students are encouraged to work with one another to better understand the course material. This includes discussing course topics, lecture notes, and assignment directions. This ***does not include*** *sharing code or algorithmic solutions, unless authorized to do so by the instructor. Students must learn to develop their own algorithmic solutions and the code to implement those solutions. When a student copies even a small part of someone else's code or algorithmic solution, the opportunity to learn the material on his or her own is jeopardized. This policy is in place to distinguish between seeking appropriate help and committing an act of plagiarism.*

Students commit plagiarism when, upon being required to do original work, they submit someone else's work as their own. The plagiarized work may be a solution to an algorithmic problem or a piece of program code; its scope may be an entire assignment, or just a part of it. The plagiarized material may be from another student in the class, from a person outside the class, or found online. A student who provides work to other students contributes to the resulting act of plagiarism and will also be held accountable.

If an act of plagiarism occurs, it will be documented in writing to the Associate Academic Dean and a penalty will be determined by the instructor of the course in consultation with the Chairperson of the Computer Science Department. Generally, the minimum penalty will consist of all parties involved receiving zero credit for the assignment. However, depending on the severity of the act and whether previous offenses have occurred (within or outside this course), receiving a grade of 'F' for the course or even dismissal from the College may be warranted."

Other College Policies

Students are expected to abide by the college policies:

- Course Catalogs: Both undergraduate and graduate catalogs are available through North Central's online catalog home page.
- Student Code of Conduct
- Academic Honesty (Cheating, Plagiarism, Sanctions) and Academic Dishonesty • Withdrawal Policy
- Assessment Disclosure: Student work products for this course may be used by the College for educational quality assurance purposes. Identifying information will be removed from your assignment to protect your confidentiality. If you do not want your assignments or coursework to be included in any assessment of learning or any type of program evaluation, please notify your instructor immediately.

Resources for Students

North Central College cares about, and is committed to, the safety and success of all members of the College community. If you or someone you know may be struggling academically and/or personally, College resources and assistance are available. As your Professor, I may seek support for you by passing information on or sharing concern with the Office of Student Affairs or the Center for Student Success by submitting an Early Alert Referral Form.

- The Center for Student Success is committed to ensuring all students have access, opportunities, and resources to achieve their highest level of academic achievement. Our programs, activities, and services support the educational objectives of the faculty and College by emphasizing personal and practical skill development so students become engaged, informed, and confident learners. To help you succeed in your courses, our academic success programs provide a range of support including individual tutoring, structured study groups, academic skills workshops, and supplemental peer-led instruction programs. Additional assistance is provided in our Writing Center, Speaking Center and Math Resource Center. See also Online Resources for Student Success.
- Student Disability Services: Student Disability Services is an office within Academic Affairs, which coordinates accommodations for undergraduate and graduate students with disabilities. We view disability as an important aspect of diversity and are committed to providing equal opportunity and meaningful access for all students. We partner with students, faculty, and staff to provide accessible environments and academic accommodations. Click here to register.
- Title IX: North Central College faculty are committed to the safety and well-being of our students, and we are available to discuss any concerns. Faculty are legally obligated to share information disclosed to them about sexual assault, dating/domestic violence, stalking, and or sexual or gender-based harassment with the Title IX Coordinator to help ensure the safety, welfare and academic success of our students. The Title IX Coordinator, Rebecca Gordon, can be contacted directly at rgordon@noctrl.edu, or by calling (630) 637-5340, to make a report, file a complaint, or obtain further information on your rights, options, and available resources. More information, the policy, resources, and an online reporting form can be accessed from the Title IX webpage. For confidential reporting, and information about resources and options, contact the Dyson Wellness Center advocate, Jessica Vasquez, at 630-637-5113. Anonymous reports can be made by calling the Campus Conduct Hotline at (866) 943-5787.
- In the event of an emergency, please call the Department of Campus Safety at 630-637-5911 and/or 911. Students may also submit an Early Alert referral if you or another member of our campus community needs assistance.
- If you have witnessed or experienced a bias-related incident, please use the Bias Incident Report form in order to file a report. Any act of intolerance, regardless of severity, can be reported. Once submitted, your report will be reviewed by the North Central College Bias Incident Response Team.
- Technical Assistance: If you are encountering difficulties with your NCC email, password, network, wireless, printing, Blackboard, or Box cloud storage, consult Instructional Technology website or contact the Help Desk at helpdesk@noctrl.edu or 630-637-5440.