

Course ID:	Course Title:	Fall 2023
BHS 410	Basic Multivariate Statistics	Prerequisite: BHS 240 and BHS 310
		Credits: 3

Class Information		Instructor Information		Important Dates	
Delivery:	In Class	Instructor:	Rodrigo Dal Ben, Ph.D.	First Day of Classes:	Sep 06
Days:	Wednesday & Friday	Email:	rod.dalben@ambrose.edu	Last Day to Add/Drop:	Sep 17
Time:	9:45 – 11:00 am	Phone:	-	Last Day to Withdraw:	Nov 20
Room:	A2133	Office:	L2107	Last Day to Apply for Extension:	Nov 23
Lab/Tutorial:	Monday – 2:30 – 4:30pm	Office Hours:	Wednesday & Friday* (in-person or online)	Last Day of Classes:	Dec 11
Final Exam:	N/A				

Important Dates and Information

- Dates: for a list of all important dates and information regarding participating in classes at Ambrose University, please refer to the Academic Calendar at <https://ambrose.edu/academic-calendar>
- *Office hours: Please schedule a time slot on https://calendly.com/rod_dalben/office-hours-fall
- Email: I check my inbox 1 time per day. I do respond all email, but it can take up to 72 hours due to the volume of messages. Email messages are a professional form of communication, please be polite when emailing. Inappropriate messages will be ignored.
- Communications: Most communications will go through Moodle, under “Announcements.” Remember to set up your Moodle account so it distributes announcements to your email address.
- Syllabus: keep a copy of this document throughout the course and **use it as a reference guide**. If you ask me for information that is already here, I will probably redirect you to this document.

Course Description

Multivariate analysis as applied to behavioural science. Correlation, simple and multiple regression, discriminant function analysis, canonical correlation, factor analysis, theories and applications of behavioural measurement, reliability, and validity will be presented. Lecture and laboratory components.

Expected Learning Outcomes

1. **Understanding:** Students should be able to articulate their understanding of foundational concepts, theories, statistical tests, and ethical principles for data analysis.
2. **Research:** Students should be able to demonstrate intermediary comprehension of quantitative data analysis in the Social Sciences. Including finding and managing research data.
3. **Analysis:** Students should be able to manage and analyze quantitative data.
4. **Communication:** Students should be able to communicate their knowledge and express themselves in written and verbal formats, doing so clearly, concisely, and compellingly — using APA conventions when suitable.
5. **Character:** Students should be able to demonstrate ethic and social responsibility when interacting with diverse Social Sciences topics that relies on quantitative data analysis.
6. **Professional Competence:** Students should be able to connect previous outcomes with their personal trajectories, potential professional trajectories, and professional goals (short-, medium-, and long-term).

Textbooks

Required:

Field, A., (2018). *Discovering statistics using IBM SPSS statistics* (5th Ed., North American Edition). Thousand Oaks, CA: Sage Publications Inc. [Available on Moodle]

Optional:

Navarro, D., & Foxcroft, D. (2019). *Learning statistics with jamovi: A tutorial for psychology students and other beginners* (Version 0.70). [Available on Moodle]

Navarro, D.J., Foxcroft, D.R., & Faulkenberry, T.J. (2019). *Learning Statistics with JASP: A Tutorial for Psychology Students and Other Beginners*. (Version 0.70). [Available on Moodle]

Software

JASP will be used for in-class activities, labs, and assignments (<https://jasp-stats.org/>). JASP is a free and open-source statistical software and is a great alternative to proprietary software.

Delivery mode

This course follows an active learning approach. Students will constantly engage with course materials, peers, and instructor to learn, understand, apply, analyze, and evaluate statistical ideas. At the same time, students will receive feedback from the instructor and their peers whenever appropriate. Students should expect a blend of lecture-based classes, in-class activities (e.g., article discussions), and labs. In the Requirements section, the main assignments are described, however, most in-class activities will be tailored to students' learning trajectories and cannot be fully anticipated.

Course Schedule

Week	Day	Topic	Readings & # of pages	Delivery Mode	Assignments & deadlines
1	Sep 06	Meet and greet, Syllabus, Moodle Dates: seminars and assignments	Syllabus (Moodle)	Fully Active	Set working Groups for the course
	Sep 08	Catching up with JASP	NA	Fully Active	NA
2	Sep 11	Lab: Placement exam	NA	Fully Active	Sep 11 - Placement exam
	Sep 13	Catching the pieces from the placement exam	Notes from BHS 310	Lecture	
	Sep 15			Lecture	
3	Sep 18	Catching pieces	Dataset (Moodle)	Lab	Sep 22 - Weekly checkpoint (5:00 PM) - Article summary (in-class): Group 01 Group 02
	Sep 20	Analysis of Variance (ANOVA)	- Field – Ch 12 (56p) - Research article (Moodle)	Lecture	
	Sep 22			Lecture & Article disc.	
4	Sep 25	Lab: ANOVA	Dataset (Moodle)	Lab	Sep 25 - Lab 01 Sep 29 - Weekly checkpoint (5:00 PM) - Article summary: Group 03 Group 04
	Sep 27	Analysis of covariance (ANCOVA)	- Field – Ch 13 (24p) - Research article (Moodle)	Lecture	
	Sep 29			Lecture & Article disc.	
5	Oct 02	Lab: ANCOVA	Dataset (Moodle)	Lab	Oct 02 - Lab 02
	Oct 04	DEEPER LIFE CONFERENCE – NO CLASS			
	Oct 06	The Phoenix of Statistics	- Field – Ch 03 (28p) - Research article (Moodle)	Article disc.	
6	Oct 09	THANKSGIVING – NO LAB			Oct 13 - Weekly checkpoint (5:00 PM) - Article summary: Group 07 Group 08
	Oct 11	Factorial ANOVA	- Field – Ch 14 (29p) - Research articles (Moodle)	Lecture	
	Oct 13			Lecture & Article disc.	
7	Oct 16	Lab: Factorial ANOVA	Dataset (Moodle)	Lab	Oct 16 - Lab 03 Oct 20 - Weekly checkpoint (5:00 PM) - Article summary: Group 09 Group 10
	Oct 18	Repeated-measures ANOVA	- Field – Ch 15 (38p) - Research article (Moodle)	Lecture	
	Oct 20			Lecture & Article disc.	

8	Oct 23	Lab: RM ANOVA	Dataset (Moodle)	Lab	Oct 23 - Lab 04 Oct 27 - Weekly checkpoint (5:00 PM) - Article summary: Group 11 Group 12
	Oct 25	Multivariate Analysis of Variance (MANOVA)	- Field – Ch 17, topics 17.1 to 17.8 (20p) - Research article (Moodle)	Lecture	
	Oct 27			Lecture & Article disc.	
9	Oct 30	Lab: MANOVA	Dataset (Moodle)	Lab	Oct 30 - Lab 05 Nov 03 - Weekly checkpoint (5:00 PM) - Article summary: Group 13
	Nov 01	Exploratory Factor Analysis	- Field – Ch 18 (38p) - Research article (Moodle)	Lecture	
	Nov 03			Lecture & Article disc.	
10	Nov 06	READING WEEK – NO CLASSES (OR ASSIGNMENTS)			
	Nov 08				
	Nov 10				
11	Nov 13	Lab: EFA	Dataset (Moodle)	Lab	Nov 13 - Lab 06 Nov 17 - Weekly checkpoint (5:00 PM)
	Nov 15	Review: Correlation & Regression	Field – Ch 08 & 9, except topics 9.10, 9.12, 9.13 (60p) - Research article (Moodle)	Lecture	
	Nov 17			Article disc.	
12	Nov 20	Lab: Regression	Dataset (Moodle)	Lab	Nov 22 - Lab 07 Nov 24 - Weekly checkpoint (5:00 PM)
	Nov 22	Multilevel models	- Field – Ch 21 (40p)	Lecture	
	Nov 24			Lecture	
13	Nov 27	Lab: Multilevel	Dataset (Moodle)	Lab	Nov 27 - Lab 08 Dec 01, in-class: Going Beyond – Preparation
	Nov 29	Multilevel models	- Research article (Moodle)	Lecture	
	Dec 01			Prepare going beyond	
14	Dec 04	Lab: Multilevel	Dataset (Moodle)	Lab	Dec 04 - Lab 09 Dec 06, in-class: Going Beyond – Presentation
	Dec 06	Going beyond	Presenting & discussing	Flash talks	
	Dec 08	Crossing line: Feedback & wrap-up			

Please note that changes to the course schedule may occur in response to student questions and conversations.

Requirements

Assignment	Grade (%)	Learning outcomes
Placement exam	2%	1, 3, 4
Weekly checkpoint	20%	1, 2, 3, 4
Research summary	15%	1, 2, 3, 4
Going beyond	15%	1, 2, 3, 4, 6
In-class participation	3%	1, 2, 3, 4, 5, 6
Lab	45%	1, 2, 3, 4
Feedback	Extra 2%	4, 5, 6

Notes:

1. **Academic integrity** is expected on ALL assignments.
2. Students are **not allowed** to use Artificial Intelligence for Weekly Checkpoints.
3. Students **are allowed** to use Artificial Intelligence (e.g., ChatGPT) for Research Summary and Going Beyond assignments. However, students are responsible for any content being submitted. **Plagiarism** will lead to the consequences outlined on Ambrose Calendar. Also, if students choose to use AI, they must **clearly indicate** in their submission whether they had done so.
4. Students **will not** be reminded about deadlines because:
 - a. It is the students' obligation to know the course schedule and refer to this syllabus as needed.
 - b. It is the students' obligation to be up to date with the course material.
 - c. It is the students' obligation to be in class so that they know what topics are being discussed.
 - d. It is the students' obligation to anticipate when the reading will be covered in class.
5. **Aside from a note from a qualified professional, there will be no makeup or deadline extension for any missed assignment.**
6. **Readings:** Students are responsible for being up to date with assigned readings. Be prepared for reading and studying an estimated 900 pages over the course (between textbook and research articles).
7. **Printing.** The instructor can print copies of the assignment summaries if requested by e-mail **at least 2 hours** before the class.

Placement exam: A test on foundational concepts covered on BHS 310 or similar courses.

Grading. Grading will be based on correct answers to questions and analyses of case-studies.

Weekly checkpoint: At the end of most weeks (according to the **Course Schedule**), students are expected to: a) read the assigned readings, b) answer a series of questions (multiple-choice and/or open-ended) on the main concepts or applications presented in the required readings (textbook and articles) and discussed in class, c) analyze, synthesize, and apply relevant concepts learned during the week to case-studies, and d) estimate how much effort was put into the week's assignments. When working with case-studies, students are **required** to submit supporting JASP output.

Grading. Grading will be based on correct answers to questions and on the [VALUE standard rubric for written communication](#) (available on Moodle) for case-study analysis, synthesis, and application, and on completion for effort-estimation.

Research summary:

- 1) Presenting group: Each group will be responsible to provide a 1-page summary (printed copy) of their assigned research article for all students and to provide a 10-minute summary of the article to kickstart the in-class discussion. The summary and the discussion must focus on methodological and statistical aspects of the research. The instructor may ask clarification or follow-up questions for the group and the answers count towards their grade.

Grading. Written summaries will be graded based on the [VALUE standard rubric for written communication](#) (available on Moodle). Oral summaries will be graded based on the [VALUE standard rubric for oral communication](#) (available on Moodle).

- 2) Audience: Before the start of the presentation, students will read all summaries for the day. Each student, in the audience, must ask at least 7 questions across all research summaries. The instructor will keep track of participation and may ask clarification or follow-up questions.

Grading. Questions will be graded based on participation (minimum of 7 questions) and the question itself will be graded based on the [VALUE standard rubric for written communication](#) (available on Moodle).

Going beyond:

- 1) Presenting group: Each group will choose a **research article** from Moodle. Based on the chosen resource, the group will:
 - a. Create a 1-page written summary of the research, focusing on the research question, methods, and statistical analyses.
 - b. Replicate the analyses reported in the paper using JASP.
 - c. Share copies of the summary and JASP output with the class on their presentation day.
 - d. Present their work in a [3-minute flash-talk](#), with Slide presentation.

Grading. Written summaries will be graded based on the [VALUE standard rubric for written communication](#) (available on Moodle). Oral and Slide presentation and answers will be graded based on the [VALUE standard rubric for oral communication](#) (available on Moodle), and, crucially, on the accuracy of the statistical analyses presented.

- 2) Audience: Before the start of the flash talks, students will read all summaries for the day. Each student, in the audience, must ask at least 2 questions across all flash talks. The instructor will keep track of participation and may ask clarification or follow-up questions.

Grading. Questions will be graded based on participation (minimum of 2 questions) and the question itself will be graded based on the [VALUE standard rubric for written communication](#) (available on Moodle).

In-class participation: Students are expected to actively participate in all in-class activities. Such activities include, but are not limited to discussions, group work, asking and answering questions (by the instructor and peers) etc. Grades will be based on frequency and quality of active participation and will be assessed by the instructor based on the [VALUE](#)

[standard rubric for critical thinking](#) (available on Moodle). The instructor may ask for the student's names for tracking participation across time or it may ask for self-assessment at different points during the semester.

Labs: During lab assignments, students will work with statistical software and open data to solve statistical problems. The instructor will provide initial instructions and supervise students during labs, providing, when necessary, additional instructions and feedback. Assignments, with all supporting files, should be submitted on Moodle, **one per group**. Assignments will be graded based on correct answers to guiding questions. Assignments are due 30 minutes after the end of each lab meeting, following the course schedule. **Late submissions will not be accepted.** Grading will be based on a mix of accuracy on objective answers and demonstrated understanding of statistical concepts through written reports and supporting JASP output. Please refer to the [VALUE rubric for written communication](#) (available on Moodle).

Feedback: Providing feedback on the course content, structure, activities, etc. (i.e., clarity, media, accessibility, connection with assigned readings, motivation) is **optional**. There will be a feedback form available on Moodle during the duration of the course. Multiple answers might be entered by the same student through the course and **answers are always anonymous**. Students that provide feedback will earn an extra 2% in their grades. Grading will be based on completion.

Attendance

In the Social Science Department we believe that learning is an active and interactive process, a joint venture between student and teacher and between student and student (i.e., learning is not just "downloading" information from teacher to student). Therefore, it is expected that professors will come to each class well-read and prepared to engage students on the topic at hand, giving students the utmost attention and respect. In turn, it is expected that students will take an active role in the learning process. This includes: (a) regular class attendance, (b) reading course material in advance of class, (c) showing up to class on time, and (d) attentively and proactively being "present" at class (i.e., not on the internet, not texting, not conversing with the person beside you). Committing to this type of "active learning" significantly increases the learning experience for both teacher and student, and reflects the Christian ethos of excellence and respect that lies at the heart of the Ambrose educational experience.

Grade Summary

Percentage	Grade	Interpretation	Grade Points
96-100	A+	Excellent	4.00
91-95	A		4.00
86-90	A-		3.70
82-85	B+	Good	3.30
75-81	B		3.00
72-74	B-		2.70
68-71	C+	Satisfactory	2.30
63-67	C		2.00
60-62	C-		1.70
56-59	D+	Poor	1.30
50-55	D	Minimal Pass	1.0
0-49	F	Failure	0.00
-	P	Pass	No grade points

Because of the nature of the Alpha 4.00 system, there can be no uniform University-wide conversion scale. The relationship between raw scores (e.g., percentages) and the resultant letter grade will depend on the nature of the course and the instructor's assessment of the level of each class, compared to similar classes taught previously. Please note that final grades will be available on student registration system. Printed grade sheets are not mailed out.

Ambrose University Important Information:

Communication

All students have received an Ambrose e-mail account upon registration. It is the student's responsibility to check this account regularly as the Ambrose email system will be the professor's instrument for notifying students of important matters (cancelled class sessions, extensions, requested appointments, etc.) between class sessions.

Exam Scheduling

Students who find a conflict in their exam schedule must submit a Revised Examination Request form to the Registrar's Office by the deadline date; please consult the Academic Calendar. Requests will be considered for the following reasons only: 1) the scheduled final examination slot conflicts with another exam; 2) the student has three final exams within three consecutive exam time blocks; 3) the scheduled final exam slot conflicts with an exam at another institution; 4) extenuating circumstances. Travel is not considered a valid excuse for re-scheduling or missing a final exam.

Standards of Behaviour in the Classroom Setting

Learning is an active and interactive process, a joint venture between student and instructor and between student and student. Some topics covered within a class may lead to strong reactions and opinions. It is important that Students understand that they are entitled to hold contradictory beliefs and that they should be encouraged to engage with these topics in a critical manner. Committing to this type of "active learning" significantly increases the learning experience for both teacher and student, and reflects the Christian imperative to pursue truth, which lies at the heart of the Ambrose educational experience. However, active discussion of controversial topics will be undertaken with respect and empathy, which are the foundations of civil discourse in the Classroom Setting. Primary responsibility for managing the classroom rests with the instructor. The instructor may direct a student to leave the class if the student engages in any behaviour that disrupts the classroom setting. If necessary, Ambrose security will be contacted to escort the student from class. Please refer to your professor regarding their electronic etiquette expectations.

Academic Integrity

We are committed to fostering personal integrity and will not overlook breaches of integrity such as plagiarism and cheating. Academic dishonesty is taken seriously at Ambrose University as it undermines our academic standards and affects the integrity of each member of our learning community. Any attempt to obtain credit for academic work through fraudulent, deceptive, or dishonest means is academic dishonesty. Plagiarism involves presenting someone else's ideas, words, or work as one's own. Plagiarism is fraud and theft, but plagiarism can also occur by accident when a student fails or forgets to acknowledge to another person's ideas or words. Plagiarism and cheating can result in a failing grade for an assignment, for the course, or immediate dismissal from the university. Students are expected to be familiar with the policies in the current Academic Calendar that deal with plagiarism, cheating, and the penalties and procedures for dealing with these matters. All cases of academic dishonesty are reported to the Academic Dean and become part of the student's permanent record.

Academic Policies

It is the responsibility of all students to become familiar with and adhere to academic policies as stated in the Academic Calendar. The academic calendar can be found at <https://ambrose.edu/content/academic-calendar-2>.

Privacy

Personal information (information about an individual that may be used to identify that individual) may be required as part of taking this class. Any information collected will only be used and disclosed for the purpose for which the collection was intended. For further information contact the Privacy Compliance Officer at privacy@ambrose.edu.

Coursework Extensions

Should a request for a time extension on coursework exceed the end of the term, a *Coursework Extension Application* must be completed and submitted to the Office of the Registrar. The extension (if granted) will be recorded on the student record. Extensions are granted at the discretion of the instructor and are normally granted for 30 days beyond the last day of the term.

Normally, Course Extension Applications will be considered only when all of the following conditions are met:

- the quality of prior course work has been satisfactory;
- circumstances beyond your control, such as an extended illness or death of a family member, make it impossible for you to complete the course work on time; and
- you submit *Coursework Extension Application* to the Office of the Registrar on or before the deadline specified in the Academic Schedule.

If granted, time extensions do not excuse you from a final examination where one has been scheduled for the course.

A temporary grade of TX will be assigned until a final grade is submitted in accordance with the new deadline.

A final grade of F will apply to:

- all course work submitted after the end of the semester unless a coursework extension has been granted; and all course work submitted after the revised due date provided by an approved extension to coursework.

Academic Success and Supports

Accessibility Services

Academic accommodation is provided to Ambrose students with disabilities in accordance with the Alberta Human Rights Act and the Canadian Charter of Rights and Freedoms. Provision of academic accommodation does not lower the academic standards of the university nor remove the need for evaluation and the need to meet essential learning outcomes. Reasonable accommodations are tailored to the individual student, are flexible, and are determined by considering the barriers within the unique environment of a postsecondary institution. It can take time to organize academic accommodations and funding for disability-related services. Students with a disability who wish to have an academic accommodation are encouraged to contact Accessibility Services as early as possible to ensure appropriate planning for any needs that may include accommodations. Staff can then meet with students to determine areas to facilitate success, and if accommodations are required, ensure those accommodations are put in place by working with faculty.

Ambrose Writing Services

Ambrose Writing services provides academic support in the four foundational literacy skills—listening, speaking, reading, and writing. It also assists students with critical thinking and the research process. Throughout the academic year, students can meet with a writing tutor for personalized support, or they can attend a variety of workshops offered by Academic Success. These services are free to students enrolled at Ambrose University. Academic Success serves all students in all disciplines and at all levels, from history to biology and from theatre to theology. To learn more, please visit <https://ambrose.edu/writingcentre>

Ambrose Tutoring Services

Ambrose Tutoring Services provides support in specific disciplinary knowledge, especially in high-demand areas such as chemistry, philosophy, math and statistics, and religious studies. These tutors also coach students in general study skills, including listening and note-taking. During the academic year, Ambrose Tutoring Services offers drop-in tutoring for courses with high demand; for other courses, students can book a one-to-one appointment with a tutor in their discipline. These services are free to students enrolled at Ambrose University. To learn more, please visit <https://ambrose.edu/tutoring>.

Mental Health Support

All of us need a support system. We encourage students to build mental health supports and to reach out when help is needed.

On Campus:

- Counselling Services: ambrose.edu/counselling
- Peer Supportive Listening: One-to-one support in Student Life office. Hours posted at ambrose.edu/wellness.
- For immediate crisis support, there are staff on campus who are trained in Suicide Intervention and Mental Health First Aid. See ambrose.edu/crisissupport for a list of staff members.

Off Campus:

- Distress Centre - 403-266-4357

- Sheldon Chumir Health Care Centre - 403-955-6200
- Emergency - 911

Sexual Violence Support

All staff, faculty, and Residence student leaders have received *Sexual Violence Response to Disclosure* training. We will support you and help you find the resources you need. There is a website with on and off campus supports – ambrose.edu/sexual-violence-response-and-awareness.

Off Campus:

- Clinic: Sheldon Chumir Health Centre - 403-955-6200
- Calgary Communities Against Sexual Abuse - 403-237-5888

Note: Students are strongly advised to retain this syllabus for their records.