

LEWIS UNIVERSITY

SYLLABUS

BIOL-59000 DATA SCIENCE PROJECT FOR LIFE SCIENTISTS

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Office: AS-233L (Romeoville Campus – Please note that all times given are **Chicago (Central) Time Zone**)

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The best way to reach me is by email. If you would like to speak on the phone, please contact me to schedule an appointment first. Barring unusual circumstances, I will monitor my email at least once a day Monday through Thursday. Customarily I will respond to your email within 24 hours, but occasionally I may take longer. You might receive responses during evenings or Friday through Sunday, but this is not to be expected. If you do not receive a reply by the second day, please resend your message.

COURSE DESCRIPTION

The student will pursue a research project that makes a scholarly contribution to existing knowledge and practice in the field of data analytics as it is applied to the Life Sciences. The student will write a formal report that documents the conduct, results, and conclusions of his or her project. Upon successful completion of the report, the student will submit the paper for review by a committee consisting of faculty in the Biology and Computer and Mathematical Science Departments, possibly along with additional experts from industry. The student will make an oral defense of the work to the committee.

Prerequisite: BIOL-51200 and a minimum of 24 hours earned in the MS Data Science program.

Credits: 3

COURSE RATIONALE

This course serves as the capstone research project for the Computational Biology and Bioinformatics Concentration of the Master of Science in Data Science program. This course reinforces the following graduate student learning outcomes through presentations and assignments:

- Synthesize theoretical and research concepts from multiple perspectives to inform inquiry and practice.
- Formulate creative responses to complex issues through critical analysis.

This course reinforces these Master of Science in Data Science Program learning outcomes through assignments and presentations:

- Prepare future professionals who specialize in implementing and choosing systems that identify trends in large data sets based on their in-depth understanding of the mathematics and computing of data science techniques and technologies.
- Involve students in interdisciplinary work that explores the application of data science techniques to solve a variety of problems.
- Ready students both for work in the industry and for future academic work.
- Instill in students a mix of theoretical understanding and applied data science capabilities that enable students to be both today's problem solvers and tomorrow's transformative innovators.

STUDENT LEARNING OUTCOMES

Upon completion of this course, students should be able to:

1. Integrate scholarly content from a variety of sources with uniquely developed analyses, providing extensions to existing research.
2. Discriminate among ethical and unethical choices in conducting scholarly research.
3. Compose publication-ready scientific content.
4. Effectively communicate the findings of the research project through oral presentation.

TEXT

No required textbooks. All necessary course materials will be provided via the Blackboard course shell. Literature necessary to support the student research project will be determined on a case-by-case basis, and will be acquired by the student with assistance from the library.

RELATIONSHIP TO MISSION

Lewis University, guided by its Catholic and Lasallian heritage, provides to a diverse student population programs for a liberal and professional education grounded in the interaction of Knowledge and Fidelity in the search for truth. Lewis promotes the development of the complete person through the pursuit of Wisdom and Justice. Fundamental to its Mission is a spirit of Association, which fosters community in all teaching, learning and service.

This course embraces the Mission of the University by fostering an environment in which each student is respected as an individual within a community of learners. In the spirit of the vision of Lewis University, the goals and objectives of this course seek to prepare students to be successful, life-long learners who are intellectually engaged, ethically grounded, socially responsible, and globally aware.

MODALITY OF INSTRUCTION

Data Science Project for Life Scientists is an online course, delivered via Blackboard.

BIOL-59000 Data Science Project for Life Scientists	
Week 1: Declaration of Research Project	<p>Readings & Media</p> <ul style="list-style-type: none"> • Format Guide for Proposal and Prospectus • Format Guide for Final Written Report • Research Guide on Library Website • Lewis University Writing Center • Open Collaborate Session Room for Student Discussion with Peers • Collaborate Session Room for "Office Hour" <p>Assignment</p> <ul style="list-style-type: none"> • Week 1 Turnitin Written Assignment - Revised Proposal and Prospectus • Week 1 Course Project - Determination of a Faculty Reviewer from Computer and Mathematical Sciences Department
Week 2: Independent Research and Project Development	<p>Readings & Media</p> <ul style="list-style-type: none"> • Research Guide on Library Website • Lewis University Writing Center • Open Collaborate Session Room for Student Discussion with Peers • Collaborate Session Room for "Office Hour" <p>Assignment</p> <ul style="list-style-type: none"> • Week 2 Turnitin Written Assignment - Progress Report
Week 3: Independent Research and Project Development	<p>Readings & Media</p> <ul style="list-style-type: none"> • Research Guide on Library Website • Lewis University Writing Center • Open Collaborate Session Room for Student Discussion with Peers • Collaborate Session Room for "Office Hour" <p>Assignment</p> <ul style="list-style-type: none"> • Week 3 Turnitin Written Assignment - Progress Report • Week 3 Course Project - Confirmation of a Faculty Reviewer from Computer and Mathematical Sciences Department

Week 4: Independent Research and Project Development	Readings & Media <ul style="list-style-type: none"> • Research Guide on Library Website • Lewis University Writing Center • Open Collaborate Session Room for Student Discussion with Peers • Collaborate Session Room for "Office Hour" Assignment <ul style="list-style-type: none"> • Week 4 Turnitin Written Assignment 1 - Progress Report
Week 5: Submission of Report Draft and Preparation of Oral Presentation	Readings & Media <ul style="list-style-type: none"> • Format Guide for Final Written Report • Research Guide on Library Website • Lewis University Writing Center • Open Collaborate Session Room for Student Discussion with Peers • Collaborate Session Room for "Office Hour" Assignment <ul style="list-style-type: none"> • Week 5 Turnitin Written Assignment 1 - Rough Draft of Written Report • Week 5 Course Project - Outline of Oral Presentation
Week 6: Preparation of Oral Presentation	Readings & Media <ul style="list-style-type: none"> • Format Guide for Final Written Report • Research Guide on Library Website • Lewis University Writing Center • Open Collaborate Session Room for Student Discussion with Peers • Collaborate Session Room for "Office Hour" Assignment <ul style="list-style-type: none"> • Week 6 Course Project - Oral Presentation: PowerPoint Slides
Week 7: Oral Presentation of Project	Assignment <ul style="list-style-type: none"> • Week 7 Course Project - Final Version PowerPoint File for Oral Presentation • Week 7 Course Project - Oral Presentation

Week 8: Submission of Final Written Report	Readings & Media <ul style="list-style-type: none"> • Format Guide for Final Written Report • Research Guide on Library Website • Lewis University Writing Center • Open Collaborate Session Room for Student Discussion with Peers • Collaborate Session Room for "Office Hour" Assignment <ul style="list-style-type: none"> • Week 8 Turnitin Written Assignment 1 - Final Copy Written Report
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COURSE REQUIREMENTS

You will need to be self-directed, self-motivated, and well-organized in your studies and in completing your course work.

1. Completing course assignments and other learning activities **can take eight (8) to eighteen (18) hours or more per week.**
2. At minimum, students should log into class 3-5 times each week.
3. You are free to work on class activities at your own time, but they will have to be submitted by the given due dates.
4. Remember, with increased freedom and flexibility, comes increased responsibility.

DUE DATES

Assignments & Course Project: Due Sunday by 11:59PM Central (exceptions to the standard due dates are noted when applicable within the weekly assignments).

Oral Presentation: Due during Week 7 (date and time will be based on scheduling with the instructor and faculty reviewer).

EVALUATION AND GRADING

Requirement	Percent of Total Grade
Written Assignments (Includes Proposal & Prospectus, Progress Reports, Rough Draft of Report, & Final Report)	70%
Course Project (Includes Communications with Faculty Reviewers, Presentation Outline, PowerPoint Presentation, and Oral Presentation)	30%
Total	100%

LATE POLICY

The expectation is that you submit all assignments by the due date. Late assignments will not be accepted unless there are special circumstances that have been discussed with your instructor in advance of the deadline. If you anticipate extenuating circumstances that will keep you from meeting a deadline, please contact me ASAP. Otherwise, all late work will receive a zero score.

GRADE AVAILABILITY

Your grades will be available online in the course menu tab titled My Grades. They are viewable only by you. Check this area frequently to make sure that your grades have been recorded correctly. It is your responsibility to monitor your progress. If you wish to dispute a grade, you must do so within one week of the grade being assigned.

GRADE SCALE

Letter grades will be assigned based on the following scale. No extra credit on a per student basis.

A	93-100 %	B-	80-82.9	D+	67-69.9
A-	90-92.9	C+	77-79.9	D	63-66.9
B+	87-89.9	C	73-76.9	D-	60-62.9
B	83-86.9	C-	70-72.9	F	60% or lower

Students have the ability to drop this course until the end of the first week with 100% refund, and the course will not appear on the student's transcript. Students may drop within the second week with a 50% refund, and the course will also not appear on the transcript. On the Monday of the third week, the withdrawal period begins, and students may take a "W" on their transcript through the end of the fifth week. Starting with the sixth week of the term, no withdrawals will be processed and the student will be issued a grade.

INSTRUCTOR PRESENCE IN COURSE

Be sure to check Announcements frequently, because I will use this format to communicate with the class as a whole. These messages will also be sent to your Lewis University email address. Please check your school email address, as this is where I will send all correspondence if I need to contact you individually. I ask that you please only email me using your University email address, rather than a personal account (often, other email address will be filtered by the mandated spam filter and I will not receive them).

In terms of grading, you can expect that I'll have assignments graded with feedback within a week after you complete the assignment, if not sooner. You can view the grades and feedback under the My Grades tab on the course menu. Feedback will be provided along with the assignment itself. I will give you as detailed of notes as possible. Please make sure to review these comments and incorporate the feedback as you work on future assignments. If you have

not received your grade/feedback on an assignment within a week, feel free to email me to inquire.

Success in an online class requires that you communicate with me whenever you have questions. If you experience any issues with course content, please let me know as soon as possible so that I may address the problem. Please do not be shy about asking – if you are having problems, it is highly likely that someone else in class has run into the same issue.

Barring unusual circumstances, I will monitor my email at least once a day Monday through Thursday. Customarily I will respond to your email within 24 hours, but occasionally I may take longer. You might receive responses at night or Friday through Sunday, but this is not to be expected. If you do not receive a reply by the second day, please resend your message.

This course will have a standing “office hour” once a week, utilizing the Collaborate interface, on Wednesdays from 3-4pm Central time. It is strongly suggested that you use this opportunity to engage in a synchronous session with me so that we can discuss progress on your project. Additionally, you may contact me through the Question Lounge Discussion Board to pose general questions your peers may benefit from as well, or directly via email. Meeting requests, aside from the weekly office hour, will be entertained and can take place via Collaborate or over the phone.

NETIQUETTE

Respect yourself and your fellow learners at all times:

- NO profanity or harassment of fellow class members will be tolerated.
- Utilize netiquette and professionalism in all communications. Click [here](#) for additional information about Netiquette.

COURSE TECHNOLOGY ISSUES

If you have problems with technology, please call the Personal Support Center 24/7 at 1-866-967-7048 or email at lewis@personalsupportcenter.com.

ACADEMIC INTEGRITY

Scholastic integrity lies at the heart of Lewis University. Plagiarism, collusion and other forms of cheating or scholastic dishonesty are incompatible with the principles of the University. Students engaging in such activities will lose credit and potentially will be dismissed from the University. The instructor will assign a grade of zero points to any exam, quiz, presentation, or assignment in which the student has compromised scholastic integrity. The student’s advisor and Chair of the Department of Biology will be notified. A second violation of this policy in this or any course will result in a final grade of “F”. For students in a program offered by the Biology Department, the second violation will result in dismissal from the program.

Cases involving academic dishonesty are initially considered and determined at the instructor level. If the student is not satisfied with the instructor’s explanation, the student may appeal at the Department/Program level. Appeal of the Department/Program decision must be made to the

Dean of the College/School. The Dean reviews the appeal and makes the final decision in all cases except those in which suspension or expulsion is recommended, and in these cases the Provost makes the final decision.

All assignments submitted by the student should be original work completed by the student submitting the assignment. This includes assignments, quizzes and exams. In writing assignments, all references must be properly cited (including paraphrasing!). Plagiarism will not be tolerated. To be clear, the following will constitute academic dishonesty: (a) copying from or looking at another student's quiz, exam or assignment; (b) allowing another student to see or copy from your quiz, exam or assignment; (c) taking content from any other source and then copy/pasting the information and claiming it as your own; (d) fabricating data rather than deriving it from experimentation; (e) using any unauthorized material for an assignment, quiz or exam; (f) altering exams/assignments after they have been graded and returned.

Plagiarism is a very serious matter. All work will be checked for authenticity. Any submitted work that includes information that has been copied and pasted directly from a website or other source will receive a score of zero. Paraphrased work should be supported by valid sources. It is recommended that students use APA (American Psychological Association) format for citations, as this is a frequently used method within the biological sciences. Purdue University offers a useful and free [online APA guide](#).

SANCTIFIED ZONE

Guided by its Catholic and Lasallian heritage, Lewis University is firmly committed to fostering a campus atmosphere that is permeated by its Mission values of Fidelity, Wisdom, Knowledge, Justice and Association. Accordingly, we have declared the University campus to be a Sanctified Zone, a place and a people *United in Diversity*. The active promotion of diversity and the opposition to all forms of prejudice and bias are a powerful and healing expression of our desire to be Signs of Faith (Signum Fidei) to each other. To learn more about the Sanctified Zone, please visit the [corresponding page](#) on the University website.

REQUESTS FOR REASONABLE ACCOMMODATIONS

Lewis University is committed to providing equal access and opportunity for participation in all programs, services and activities. If you are a student with a disability who would like to request a reasonable accommodation, please speak with the Learning Access Coordinator at the Center for Academic Success and Enrichment (CASE). Please make an appointment by calling 815-836-5593 or emailing learningaccess@lewisu.edu. Since accommodations require early planning and are not provided retroactively, it is recommended that you make your request prior to or during the first week of class. It is not necessary to disclose the nature of your disability to your instructor. For more information about academic support services, visit the [corresponding page](#) of the University website.

Lewis University has adopted Blackboard Ally, providing alternative formats for files uploaded by instructors. Students can click the down arrow next to any file, and select *Alternative Formats*.

ADDITIONAL INFORMATION

It is important to be informed about additional campus policies – please visit the following sections of the University website as necessary.

- [University Student Complaint Policy](#)
- [University Grade Appeal Policy](#)
- [Copyright and Intellectual Policy Guidelines](#)

Grading Rubrics

Week 1 Revised Proposal and Prospectus Rubric

Criterion	5	4	3	2	1
Progression	Excellent progression of the content with logical synthesis of evidence	Content displays logical progression with appropriate synthesis of evidence	Content adequately structured with some synthesis of evidence	Content partially organized, evidence disjointed	Content not well organized, evidence lacking
Purpose	Main purpose clearly evident throughout, with all aspects clearly connected, and demonstration of extensions that will be made from the existing literature	Above average expression of the main purpose, ideas well defined and connected with above average demonstration of knowledge, extensions that will be made.	Adequate expression of main purpose, connection of ideas, and allusion to extensions that will be made	Expression of the main purpose and included concepts inconsistent and somewhat disconnected; extensions that will be made stated, but not clearly tied to publication record	Inadequate expression of main purpose; ideas unclear and disjointed; not clear how new contribution will be made
Bibliography	Exemplary report of at least 10 references (mostly primary sources, supplemented by additional resources) with full citation (APA format) and summary of how each will support the project	Report of at least 10 references (even number of primary and secondary sources) with full citation (APA format) and summary	Report of 10 sources, but not in correct format or incomplete summary	Less than 10 sources given, but correct in format, summary	Insufficient number of sources, inadequate information provided

Weeks 2-4 Progress Report Rubric

Criterion	5	4	3	2	1
Content	Exemplary demonstration of project progression; provided materials greatly augment the status of ongoing research	Very good demonstration of project progression; provided materials show ongoing research work	Adequate demonstration of project progression; some ideas posed or resources shared, but not fully connected to previous work	Limited demonstration of project progression; is not clear that significant gains have been made	Inadequate demonstration of project progression; update does not demonstrate time has been devoted to working on project
Grammar	Less than 3 spelling, grammatical or mechanical errors	No more than 5 spelling, grammatical and/or mechanical errors	Fewer than 8 spelling, grammatical and/or mechanical errors	Less than 10 spelling, grammatical and/or mechanical errors	More than 10 spelling, grammatical and/or mechanical errors

Week 5 Rough Draft Rubric

Criterion	5	4	3	2	1
Abstract	Concisely and clearly covers all key components of the document: rationale, objective(s), methods, results, conclusions and implications	Concisely and clearly covers all but one key component OR clearly covers all key components but could be a little more concise	Covers most key components but could be conveyed more clearly and/or concisely	Many key components are missing; those stated are unclear and/or are not stated concisely	Abstract is missing or, if present, provides no relevant information
Introduction	Clearly, concisely and logically presents all key components: relevant and correctly cited background information, rationale, objectives, approach	Concisely and clearly covers all but one key component (with exception of rationale) OR clearly covers all key components but could be a little more concise	Covers most key components but could be done much more logically, clearly, and/or concisely	Many key components are very weak or missing; those stated are unclear and/or are not stated concisely. Weak/missing components make it difficult to follow the rest of the paper	Introduction provides little to no relevant information
Methods	Concisely, clearly and chronologically describes procedure used so that a knowledgeable reader could replicate; methods appropriate for the project	Concisely, clearly and chronologically describes procedure used so that reader could replicate most with the exception of a few minor details; methods used are appropriate. Minor problems with organization OR some irrelevant information	Procedure is presented such that a reader could replicate only after learning a few more key details OR methods used are reasonably appropriate for project, though a more straightforward approach might have been taken	Procedure is presented such that a reader could replicate BUT methods are largely inappropriate; OR procedure is presented such that a reader could replicate only after learning several more key details	So little information is presented that reader could not possibly replicate OR methods are entirely inappropriate

Results	Contains concise, well-organized narrative text and tables/figures that highlight key trends/patterns/output produced through applied methodology; refrains from providing interpretation of outcomes. Tables/figures have appropriate labels with legends (can stand on their own)	Has presented both a concise, narrative text and informative tables/figures without interpretation but has made a few minor omissions or has other relatively small problems	Has presented findings with a reasonably good narrative text, has informative tables/figures, but has 2-3 problems such as: relevant data mixed with unnecessary information; information provided in tables/figures but not written about in the text; tables/figures are not adequately labeled/described such that they could stand on their own; interpretation briefly made	Has 3-5 problems such as: narrative text and tables/figures are minimal and mostly uninformative; some relevant data given, but mixed with irrelevant information; major concepts are obscured in tables/figures, not explicitly noted in the text; interpretations and conclusions given	Major problems that leave the reader uninformed; lack of narrative text; tables/figures contain unclear and/or irrelevant information
Conclusion	Clearly, concisely and logically presents all key components of research; evaluates outcomes in terms of the objective of the study; compares outcomes with relevant findings in literature; evaluates experimental design, evaluates reliability of data; states implications of results, suggests next investigation steps; ends with final conclusion	Concisely, clearly and logically covers all but 1-2 key components OR clearly covers all key components but could be more concise OR has discussed outcomes of project but also included a laundry list of experimental problems without discussing their impact on conclusions	Covers most key components but could be done much more logically, clearly and/or concisely	Many key components are very weak or missing; those stated are unclear and/or are not concise	Most key components are missing or very weakly done

Progression	Excellent progression of the content with logical synthesis of evidence	Content displays logical progression with appropriate synthesis of evidence	Content adequately structured with some synthesis of evidence	Content partially organized, evidence disjointed	Content not well organized, evidence lacking
Synthesis	Exemplary use of the literature to support the project; literature used exemplifies current state of knowledge and is used critically	Literature used supports the project and is accurately portrayed, but contains some unnecessary information and/or is not a complete representation of the literature	Literature used appropriate to the project topic and adequate comprehension of material displayed, but conceptual detail is lacking; adequate but limited review of literature.	Literature used appropriate to the project topic but evidence of comprehension lacking; inadequate review of the literature	Literature used not always appropriate to the project topic; no evidence of comprehension; insufficient review of the literature
Format	All sections are included in the correct order; tables/figures are correctly formatted; citations are correctly provided; margins, page numbers and sections/sub-sections are provided correctly; appropriate use of person and tense; other misc. stylistic components as designated in the Format Guide	All major sections of the paper are correctly provided, with 1-2 minor errors in stylistic formatting	All major sections of the paper are correctly provided, with 3-4 errors in stylistic formatting	Most major sections of the paper are provided, but are not presented in the appropriate format	Missing components of the paper; lack of regard for formatting requirements
Grammar	Less than 3 spelling, grammatical or mechanical errors	No more than 5 spelling, grammatical and/or mechanical errors	Fewer than 8 spelling, grammatical and/or mechanical errors	Less than 10 spelling, grammatical and/or mechanical errors	More than 10 spelling, grammatical and/or mechanical errors

Week 6 PowerPoint Presentation Rubric

Criterion	5	4	3	2	1
Logical Progression of Thought	Excellent progression of the content with logical synthesis of evidence	Content displays logical progression with appropriate synthesis of evidence	Content adequately structured with some synthesis of evidence	Content partially organized, evidence disjointed	Content not well organized, evidence lacking
Content	Exemplary use of credible resources, novel contribution of information and clear demonstration of understanding of the topic	Very good use of credible resources, novel contribution of information and demonstration of understanding of the topic	Adequate use of credible resources, contribution of some new information and understanding of the topic	Limited use of credible resources, contribution of new information and understanding of the topic	Inadequate use of credible resources, does not demonstrate newly contributed information, understanding of the topic not demonstrated

Visual Aids	Exemplary use of figures and diagrams that were of sufficient size and quality and complemented the overall intent/focus of the presentation	Figures and diagrams were used consistently, were of sufficient size and quality, and supported the focus of the presentation	Figures and diagrams adequate, of sufficient size and connected to the presentation	Figures and diagrams used occasionally, not completely appropriate in size and/or quality, somewhat connected to the presentation	Figures and diagrams rarely used, were of insufficient size and quality, not clearly connected to the focus of the presentation
Use of Text	Exceptional use of text to summarize key points and complement visuals, but does not fill entire slide with lengthy writing.	Text used consistently to support figures and diagrams, makes clear the focus of the presentation.	Usage of text adequate, connected to the presentation.	Text usage is lengthy and/or overwhelming; content of text somewhat connected to the presentation.	Text usage does not summarize key points, overwhelms the use of visual aids, detracts from the focus of the presentation.

Week 7 Oral Presentation Rubric

Criterion	5	4	3	2	1
Organization	Main purpose clearly evident throughout with all aspects of the presentation clearly connected with ideas extended in a way that demonstrates exemplary knowledge of the topic	Above average expression of the main purpose, ideas well defined and connected with above average demonstration of knowledge displayed	Adequate expression of the main purpose and connections, ideas clear with appropriate demonstration of knowledge displayed	Expression of the main purpose inconsistent and somewhat disconnected, concepts vague with some demonstration of knowledge displayed	Inadequate expression of the main purpose, ideas unclear and disjointed with no connections and little demonstration of knowledge displayed

Content	Exemplary use of credible resources, novel contribution of information and clear demonstration of understanding of the topic	Very good use of credible resources, novel contribution of information and demonstration of understanding of the topic	Adequate use of credible resources, contribution of some new information and understanding of the topic	Limited use of credible resources, contribution of new information and understanding of the topic	Inadequate use of credible resources, does not demonstrate newly contributed information, understanding of the topic not demonstrated
Visual Aids/Text	Exemplary use of figures and diagrams that were of sufficient size and quality and complemented the overall intent/focus of the presentation; exceptional use of text to summarize key points and complement visuals, but does not fill entire slide with lengthy writing	Figures and diagrams were used consistently, were of sufficient size and quality, and supported the focus of the presentation; Text used consistently to support figures and diagrams, makes clear the focus of the presentation	Figures and diagrams adequate, of sufficient size and connected to the presentation; usage of text adequate, connected to the presentation	Figures and diagrams used occasionally, not completely appropriate in size and/or quality, somewhat connected to the presentation; text usage is lengthy and/or overwhelming; content of text somewhat connected to the presentation	Figures and diagrams rarely used, were of insufficient size and quality, not clearly connected to the focus of the presentation; text usage does not summarize key points, overwhelms the use of visual aids, detracts from the focus of the presentation
Delivery Techniques	Exceptional pace, volume, articulation, and tone; delivery displays exemplary enthusiasm, confidence	Above average pace, volume, articulation, and tone; delivery displays enthusiasm, confidence	Satisfactory pace, volume, articulation, and tone; delivery adequate as to enthusiasm and/or confidence	Inadequate pace, volume, articulation, and tone; delivery displays limited enthusiasm and/or confidence	Unsatisfactory pace, volume, articulation, and tone; delivery apathetic and lacking in enthusiasm, confidence

Week 8 Final Written Report Rubric

Criterion	20	16	12	8	4
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Methods	Concisely, clearly and chronologically describes procedure used so that a knowledgeable reader could replicate; methods appropriate for the project	Concisely, clearly and chronologically describes procedure used so that reader could replicate most with the exception of a few minor details; methods used are appropriate. Minor problems with organization OR some irrelevant information	Procedure is presented such that a reader could replicate only after learning a few more key details OR methods used are reasonably appropriate for project, though a more straightforward approach might have been taken	Procedure is presented such that a reader could replicate BUT methods are largely inappropriate; OR procedure is presented such that a reader could replicate only after learning several more key details	So little information is presented that reader could not possibly replicate OR methods are entirely inappropriate
Results	Contains concise, well-organized narrative text and tables/figures that highlight key trends/patterns/output produced through applied methodology; refrains from providing interpretation of outcomes. Tables/figures have appropriate labels with legends (can stand on their own)	Has presented both a concise, narrative text and informative tables/figures without interpretation but has made a few minor omissions or has other relatively small problems	Has presented findings with a reasonably good narrative text, has informative tables/figures, but has 2-3 problems such as: relevant data mixed with unnecessary information; information provided in tables/figures but not written about in the text; tables/figures are not adequately labeled/described such that they could stand on their own; interpretation briefly made	Has 3-5 problems such as: narrative text and tables/figures are minimal and mostly uninformative; some relevant data given, but mixed with irrelevant information; major concepts are obscured in tables/figures, not explicitly noted in the text; interpretations and conclusions given	Major problems that leave the reader uninformed; lack of narrative text; tables/figures contain unclear and/or irrelevant information
Criterion	10	8	6	4	2

Progression	Excellent progression of the content with logical synthesis of evidence	Content displays logical progression with appropriate synthesis of evidence	Content adequately structured with some synthesis of evidence	Content partially organized, evidence disjointed	Content not well organized, evidence lacking
Synthesis	Exemplary use of the literature to support the project; literature used exemplifies current state of knowledge and is used critically	Literature used supports the project and is accurately portrayed, but contains some unnecessary information and/or is not a complete representation of the literature	Literature used appropriate to the project topic and adequate comprehension of material displayed, but conceptual detail is lacking; adequate but limited review of literature.	Literature used appropriate to the project topic but evidence of comprehension lacking; inadequate review of the literature	Literature used not always appropriate to the project topic; no evidence of comprehension ; insufficient review of the literature
Introduction	Clearly, concisely and logically presents all key components: relevant and correctly cited background information, rationale, objectives, approach	Concisely and clearly covers all but one key component (with exception of rationale) OR clearly covers all key components but could be a little more concise	Covers most key components but could be done much more logically, clearly, and/or concisely	Many key components are very weak or missing; those stated are unclear and/or are not stated concisely. Weak/missing components make it difficult to follow the rest of the paper	Introduction provides little to no relevant information

Conclusion	Clearly, concisely and logically presents all key components of research; evaluates outcomes in terms of the objective of the study; compares outcomes with relevant findings in literature; evaluates experimental design, evaluates reliability of data; states implications of results, suggests next investigation steps; ends with final conclusion	Concisely, clearly and logically covers all but 1-2 key components OR clearly covers all key components but could be more concise OR has discussed outcomes of project but also included a laundry list of experimental problems without discussing their impact on conclusions	Covers most key components but could be done much more logically, clearly and/or concisely	Many key components are very weak or missing; those stated are unclear and/or are not concise	Most key components are missing or very weakly done
Criterion	5	4	3	2	1
Abstract	Concisely and clearly covers all key components of the document: rationale, objective(s), methods, results, conclusions and implications	Concisely and clearly covers all but one key component OR clearly covers all key components but could be a little more concise	Covers most key components but could be conveyed more clearly and/or concisely	Many key components are missing; those stated are unclear and/or are not stated concisely	Abstract is missing or, if present, provides no relevant information
Grammar	Less than 3 spelling, grammatical or mechanical errors	No more than 5 spelling, grammatical and/or mechanical errors	Fewer than 8 spelling, grammatical and/or mechanical errors	Less than 10 spelling, grammatical and/or mechanical errors	More than 10 spelling, grammatical and/or mechanical errors

Citations	Exemplary report of related references (mostly primary sources, supplemented by additional resources) with appropriate in text citations to support statements and full citation (APA format) provided in the Literature Cited section	Adequate report of references (even number of primary and secondary sources) with appropriate in text and full citation (APA format)	Report of references, but not from appropriate sources or reported incorrectly in text and/or in the Literature Cited section	Less than 10 sources given, not representative of literature in the field, in text citations or Literature Cited listing deficient	Insufficient number of sources, inadequate information provided
Format	All sections are included in the correct order; tables/figures are correctly formatted; citations are correctly provided; margins, page numbers and sections/sub-sections are provided correctly; appropriate use of person and tense; other misc. stylistic components as designated in the Format Guide	All major sections of the paper are correctly provided, with 1-2 minor errors in stylistic formatting	All major sections of the paper are correctly provided, with 3-4 errors in stylistic formatting	Most major sections of the paper are provided, but are not presented in the appropriate format	Missing components of the paper; lack of regard for formatting requirements

NOTE: Only students enrolled in this course are permitted to view the course materials.

Personal Support Center, call toll-free, 24/7: 1-866-967-7048, lewis@personalsupportcenter.com