OCSC 4922 / BIOL 4913 – SPECIAL TOPICS IN MARINE ANIMAL DIVERSITY

1. Description
This course replaces OCSC / BIOL 4122 in W2020 following the necessity to offer courses remotely under the imperatives of COVID-19 pandemic. It is offered in the same intensive format.

The course aims to provide an in-depth examination of cellular, physiological, behavioural and ecological adaptations in marine animals. Lectures are combined with discussions of relevant papers from the primary literature on topics of current interest which may relate morphology, ecology, evolution, natural history, species interactions and practical applications. As a substitute for the hands-on component of the course, students also gain experience in the development of research project proposals.

Learning outcomes
Upon successful completion of this course, you will be able to:

- Discuss adaptations in a diversity of marine animals inhabiting various environments.
- Understand the foundations of scientific research on marine animals.
- Understand and apply basic research principles in marine biology and ecology.
- Assess and communicate the significance and limitations of research results.

2. Evaluation

Research proposals (2x30%) 60%
Students will be required to submit two research proposals, one at the end of week 1 and the other at then end of week 2. Templates/guidelines will be provided ahead of time and submissions will be made through the Assignments folder.

Oral presentation 20%
Presentation skills will be evaluated as each student submits a 10-min video presentation on a species/topic of their choice.

Readings and discussions 20%
Students will be expected to read assigned papers\(^1\) that will be the topics of daily online discussion. Each day, a student will be assigned to open/lead the debate by posting a brief synopsis of the assigned paper and formulating the first comments to open the general discussion. All students will be required to make at least two subsequent posts/replies in each of the daily forums.

\(^1\)Note that the list of papers will be made available on Brightspace before the start of the course.

News reports (extra credits) 5%
Students will be given the opportunity to submit up to two summaries (2 pp; single-spaced; worth max. 2.5%) of scientific news or events related to marine science (e.g. from conference, blog, news site, newspaper, live event). Summaries should include a clear overview of major ideas/findings presented and a critical assessment of their strengths, limitations, etc, and will be submitted through the Assignments folder. These are essentially free bonus points.
3. Schedule

- **Morning discussions (1 h):** You are expected to have read the assigned paper ahead of time. Access the appropriate discussion forum to participate. At least one student will be assigned the lead; they will open the discussion by posting a ~300-word summary and initial assessment, and they will stimulate/moderate the forum for that paper (more than one leader per paper may be required depending on the number of participants – i.e. each student must be the leader at least once). All students (including lead) must submit a minimum of two subsequent posts/replies on each assigned reading.
- **Morning lectures (1-2 h):** The instructor will deliver short lectures, and the TAs and instructor will also be available periodically for Q&A, through Online Rooms.
- **Afternoons:** The afternoon sessions will be dedicated to self guided work on the major components of the course (video presentation and research proposals).
- **Other:** Students may schedule one-on-one meetings upon request.

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<thead>
<tr>
<th>DAY</th>
<th>TIME</th>
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<tr>
<td></td>
<td>9:00-12:00 Online Rooms &amp; Discussion Forums</td>
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<tr>
<td>1</td>
<td>12:00-13:00 Lunch</td>
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<tr>
<td>20 April</td>
<td>Research and identify topic of video presentation.</td>
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<td>Research Proposal I.</td>
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<td>2</td>
<td>12:00-13:00 Lunch</td>
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<tr>
<td>21 April</td>
<td>Submit topic of video presentation by end of class.</td>
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<td></td>
<td>Submit topic of Proposal I by end of class.</td>
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<tr>
<td>3</td>
<td>Lunch</td>
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<tr>
<td>22 April</td>
<td>Work on video presentation.</td>
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<td>Work on Proposal I.</td>
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<td>4</td>
<td>Lunch</td>
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<tr>
<td>23 April</td>
<td>Work on video presentation.</td>
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<td></td>
<td>Work on Proposal I.</td>
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<td>5</td>
<td>Lunch</td>
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<tr>
<td>24 April</td>
<td>Submit Proposal I by end of class.</td>
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<td>Work on video presentation.</td>
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<td>6</td>
<td>Lunch</td>
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<tr>
<td>25 April</td>
<td>Submit topic of Proposal II by end of class.</td>
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<td>7</td>
<td>Lunch</td>
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<tr>
<td>26 April</td>
<td>Work on video presentation.</td>
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<td>Prepare Proposal II.</td>
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<td>8</td>
<td>Lunch</td>
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<tr>
<td>27 April</td>
<td>Submit topic of Proposal II by end of class.</td>
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<tr>
<td>9</td>
<td>Lunch</td>
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<tr>
<td>28 April</td>
<td>Work on video presentation.</td>
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<td></td>
<td>Prepare Proposal II.</td>
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<td>10</td>
<td>Lunch</td>
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<td>29 April</td>
<td>Work on video presentation.</td>
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<td></td>
<td>Prepare Proposal II.</td>
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<td>11</td>
<td>Lunch</td>
</tr>
<tr>
<td>30 April</td>
<td>Prepare Proposal II.</td>
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<tr>
<td></td>
<td>Review videos.</td>
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<tr>
<td>12</td>
<td>Lunch</td>
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<tr>
<td>1 May</td>
<td>Submit Proposal II by end of class.</td>
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</table>

Submit Proposal II by end of class.
4. Textbooks

No textbook required.

5. Suggested Resources


Additional lists of suggested resources are available on the course shell

6. Instructor

Dr. Annie Mercier
Office: AX-4022A
Tel: 864-2011
Email: amercier@mun.ca

Teaching Assistants (TAs):

<table>
<thead>
<tr>
<th>Sara Jobson</th>
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<tr>
<td>Molly Rivers</td>
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<tr>
<td>Britney Stuckless</td>
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7. Assessment Guidelines

7.1 Research proposals (60%)
You will need to submit two research proposals valued at 30% each (one at the end of each week). The topic of the research being proposed is open but must be approved by the instructor by the deadline indicated in the course schedule.

See Appendix 1 for template, tips and grading rubric.

7.2 Oral presentation (20%)
Oral skills will be evaluated as each student submits a video presentation on a chosen marine animal (or group of marine animals). This can either be focused on a species or a broader taxonomic level, depending on the circumstances. The topic must be approved by the instructor by the deadline indicated in the course schedule. The student may present and discuss aspects of the morphology, behaviour, ecology, physiology, and evolutionary biology of the chosen marine taxon. The presentation should include the student’s original ideas and views (e.g. highlighting any special interest, current questions, gaps in the knowledge, future areas of research). This presentation should be well grounded in the primary literature (scientific papers) rather than solely on textbook material.

All presentations must adhere to the required duration (9-10 min).

See Appendix 1 for tips and grading rubric. Videos will also be given a score by classmates.

7.3 Readings & participation (20%)
Each of the 10 discussions will be worth 2%. Evaluation will be based on the following criteria:

- Level or preparation/involvement in the discussion.
- Efficacy as discussion leader (when it is your turn).
- Quality of posts (spelling, grammar, logical flow).

7.4 Extra credits (up to 5%)
Two “extra credit” seminar/activity/news reports, worth a maximum of 2.5% each, may be submitted. In other words, there are 105% available in the class but grades will be calculated as if there were only 100% available. The extra credits are basically free points.

You can prepare an extra credit report based on a conference or event you recently attended, or based on news/information seen on a reputable website (blog, newswire, scientific journal). The event/news/seminar must relate to biological or ocean sciences in some way.

A report must be 1.5 to 2 pages (single-spaced). It will include: (1) a full description and clear overview of the event attended or news report, (2) a clear outline of the major activities/findings, (3) a critical assessment of their strengths and limitations. For this last segment, I want to know what you thought of both the (3a) contents and (3b) the delivery. There will be deductions for grammar and spelling errors.

A maximum of two extra credit reports can be submitted at any time during the course. Submissions will be accepted until the end of the last day of class.
8. Appendix 1 – Grading Rubrics & Helpful Resources

8.1 Research Proposal

8.1.1 Tips for preparing your research proposals

The proposal should be 8-10 pages (double spaced), excluding the title page, references and tables/figures.

Title Page

- Title of the project. The title says what you plan to do. It should be brief (aim for ten words or less) and clearly outline the main point of the investigation. For example: "Effects of temperature on feeding rates of green sea urchins".
- Name author with affiliation.
- Date submitted

Abstract This section provides a brief (~1 page) description of the purpose and objectives of the investigation. It should indicate the questions or hypotheses you will be seeking to answer or test. The abstract enables reviewers to quickly grasp the nature and importance of your proposal.

Introduction The Introduction (~3 pages) details the purpose of the project. It usually contains all the background information relevant to the project (explain why this topic is of interest, what studies already exist, and what the gaps in knowledge are, etc.).

Objectives Briefly state (~½ page) the key hypotheses, questions or objectives, and outline of the chosen approach (explain how the objectives will be met or the hypotheses tested).

Materials & Methods Describe the steps you plan to complete during your investigation, and the methods to be used (~2-3 pages). Be sufficiently detailed that anyone could read this section and understand your proposed protocols and match them to your objectives. It may be helpful to provide a Figure (flow chart, map) to illustrate your study site, study approach, experimental setup; or a Table to list your different study sites or experimental conditions.

Plan Present a clear overview of the timeline of your proposed project (~½ – 1 page). Using a Gantt chart may be useful here to identify milestones (main research segments) and the time ascribed to each (these may include things like purchase of equipment and supplies, laboratory setup, field study, animal or sample collection, subsampling or data collection, data processing, data analysis, writing of research results, etc.).

Relevance & significance Briefly (~½ - ¾ page) but convincingly state the relevance (timeliness) of the project, and the anticipated significance of the anticipated findings (this is your final sales pitch).

References A research proposal must contain a fairly exhaustive literature review (≥ 15 references), which is presented in the introduction. Support all statements with appropriate citations and make sure to list all references cited. Use a clear and consistent style (see reading assignments for examples).

Tables & Figures Tables and/or Figures must be numbered consecutively and labeled with a descriptive caption (the caption appears above a Table, and under a Figure). They can be included in the text where appropriate or at the end of the proposal after the References (Tables followed by Figures). Be sure to refer to all listed Tables and Figures in the text of your proposal.

NOTE: Be careful to avoid the many forms of plagiarism (you may not always realize you are doing it, and penalties are severe). A guide can be found here (http://www.mun.ca/writingcentre/plagiarism/) that includes a useful FAQ (https://www.mun.ca/writingcentre/plagiarism/faq.php). No form of plagiarism will be sanctioned in this course.
8.1.2 RUBRIC for grading the project proposals

Title Page (____/2)
0. Absent
1. Incomplete
2. Complete

Abstract (____/6)
2. Incomplete, not outlining the project purpose and all objectives
4. Fairly complete but missing a few or key aspect (purpose or objectives)
6. Complete and clear

Introduction (____/20)
Background information (____/5)
0. No background info
1. General background info only from class material or textbooks
2. Background info superficial (few sources cited)
3. Background info with expanded explanations, but not complete (< 15 sources)
4. Good background info from at least 15 sources, including primary papers
5. Background info extensive, detailed explanations and diversified cited sources (≥15)

Support (____/10)
0. No sources cited to support statements
2. Citations missing for most statements
4. Citations missing for several statements
6. Citations missing for few statements
8. Most statements supported, but some unclear or inadequate
10. Most/all statements appropriately supported

Organism(s) or system to be studied is/are well detailed (____/3)

Gaps in knowledge identified (____/2)

Objectives (____/10)
2. Poor statement of project purpose, no clear objectives/hypotheses
4. Adequate statement of purpose, no clear objectives/hypotheses
6. Good statement of purpose, no clear objectives/hypotheses
8. Good statement of purpose and clear objectives/hypotheses
10. Excellent statement of project purpose and clear objectives/hypotheses

Materials & Methods (____/20)
Organization (____/4)
0. No text subdivisions or logical flow
1. Few/unclear subdivisions, weak flow
2. Poorly justified subdivisions, poor flow
3. Good, clear subdivisions, logical flow
4. Excellent, well justified subdivisions, great flow
Use of tables/figures/charts (___/2)
0. Tables/figures would have been useful but were not included
1. Tables/figures were used, but were incomplete or not clear
2. Table/figures were used and were clear, or were not warranted

Completeness of description (___/10)
2. Very minimal/incomplete description of methods, no clear link to objectives
4. Some elements present but many missing, no clear link to objectives
6. Relatively complete description but missing key elements and/or link to objectives
8. Complete description, touching on all objectives, but not always clear
10. Complete and clear description, clearly linked to objectives

Clarity of description (___/4)
1. Largely unclear description of methods (hard to follow reasoning)
2. Mix of clear and unclear segments
3. Largely clear, only minor aspects unclear
4. Wholly clear description of methods (reasoning easy to follow)

Plan (___/8)
2. Unclear or largely incomplete research plan
4. Clear plan, but missing key project segments/milestones
6. Clear, complete plan, but unrealistic timeline
8. Clear, complete, and realistic plan

Relevance & significance (___/16)
Relevance (___/8)
2. No attempt to highlight timeliness / relevance of proposed project
4. Weak relevance, or not well explained
6. Weak relevance, but well explained, or good relevance but not well explained
8. Good or great relevance, well explained

Significance and perspectives (___/8)
2. No attempt to highlight significance of anticipated findings
4. Weak attempt to highlight significance (unconvincing)
6. Good attempt to highlight significance (fairly convincing)
8. Significance of anticipated findings well highlighted, highly convincing sales pitch

References (___/10)
Completeness (___/5)
1. Section on references missing or misplaced
2. Most citations/references incomplete or unclear
3. Some citations/references incomplete or unclear
4. Most citations/references complete and clear
5. All citations/references complete and clear
Style/format (___/4)
1. Several style inconsistencies
2. A few style inconsistencies
3. Style largely consistent
4. No inconsistencies detected

Number/nature of references appropriate (___/1)

Spelling and grammar (___/4)
0. Innumerable typos and/or grammatical errors
1. Many typos and/or grammatical errors
2. Relatively few typos and/or grammatical errors
3. Very few typos and/or grammatical errors
4. No typos and/or grammatical errors

Format (___/4)

Adherence to total length requirements, between 8-10 pages of text (___/2)

Appropriateness of length for each proposal section (___/2)

Total _____/100 (two proposals worth 30% each for a total of 60%)
8.1.3 External resources on writing research proposals

You must adhere to the guidelines provided inside this course, but you may wish to get further insight from the following:

https://www.mhc.ab.ca/services/academicsupport/~/media/a6c5e5b4dc184e8d8c72d72ec7032a2c.ashx

https://www.mcgill.ca/gps/students/progress-tracking/proposals


https://www.ncbi.nlm.nih.gov/pmc/articles/PMC3282423/

https://conservationbytes.com/2015/05/04/twenty-tips-for-writing-a-research-proposal/
## 8.2 Video Presentations

### 8.2.1 Tips for preparing your video presentation

<table>
<thead>
<tr>
<th>SECTION (weight)</th>
<th>TIPS</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Content (35 pts)</strong></td>
<td>Ask yourself: Is the technical component clear, is the coverage of material sufficient or insufficient, is there a logical flow to the content presented?</td>
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<td></td>
<td>The presenter should:</td>
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<tr>
<td></td>
<td>• Relate topic clearly to audience</td>
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<td></td>
<td>• Remain on topic</td>
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<td></td>
<td>• Include sufficient information, scientific evidence</td>
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<td></td>
<td>• Use authoritative, credible evidence (mainly primary publications)</td>
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<tr>
<td></td>
<td>• Clearly cite sources for data shown and assertions made</td>
</tr>
<tr>
<td><strong>Organization (35 pts)</strong></td>
<td>Ask yourself: Do you have a clear idea of the different elements of your presentation? Are you using presentation aid(s) – whether slides or props or other aids – in an appropriate and efficient manner (e.g. are the slides overcrowded, the font size too small, do you position yourself adequately, is what you are showing clear)?</td>
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<td>During the different parts of the talk, the presenter should:</td>
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<td></td>
<td>• <strong>Introduction</strong></td>
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<td></td>
<td>Secure audience attention</td>
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<td>Clearly establish purpose/topic for presentation</td>
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<td></td>
<td>• <strong>Body</strong></td>
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<td>Use clear organizational pattern (logical flow)</td>
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<td>Use transitions between points</td>
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<td>• <strong>Conclusion</strong></td>
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<td>Offer a summary of topic/ideas</td>
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<td>Provide closure (take home message)</td>
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<td><strong>Delivery (30 pts)</strong></td>
<td>Ask yourself: Are you speaking too quickly, are you projecting your voice, are you looking at the audience, do you speak in full sentences and in a coherent fashion or do you wander from topic to topic, do you exhibit a good/confident posture? Do you finish your talk within the time allotted?</td>
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<td>The presenter should:</td>
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<td></td>
<td>• Effectively use vocal variety in rate and intensity to maintain audience interest</td>
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<td>• Use appropriate pronunciation, articulation, grammar</td>
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<td></td>
<td>• Use language that is appropriate to scientific topic and audience</td>
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<td></td>
<td>• Use physical behaviours that support the message (including appropriate eye contact, facial expressions, gestures, posture, personal appearance)</td>
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<td>• Adhere to time requirements (making good use of time without going over)</td>
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</table>
8.2.2 RUBRIC for grading video presentations

Content – Coverage
Topic was well mastered and covered adequately (good balance between breadth and in depth).
15 13 11 9 7 5 3 1

Content – Support
Arguments and photos/figures/props clearly presented and properly supported where appropriate (e.g. citing sources, credit, for images and statements).
10 8 6 4 2

Content – Logical flow
Presentation flowed smoothly, with logical links between major themes/segments.
10 8 6 4 2

Organization – Introduction / conclusion
Presentation included a clear introduction and a clear conclusion.
10 8 6 4 2

Organization – Structure
Major segments/themes of the presentation were appropriately separated to optimize clarity. Each was devoted an adequate amount of slides/time.
15 13 11 9 7 5 3 1

Organization – Layout / design of visual aids
Slides/images were not cluttered and font size was appropriate, easy to read. Text and images were balanced and adequately chosen to explain/present the material. Props were used adequately.
10 8 6 4 2

Delivery – Clarity
The presentation was enjoyable / entertaining (good pace, voice projection, pronunciation, eye contact, appropriate use/balance of visual aids).
10 8 6 4 2

Delivery – Time
Made effective use of time (not too short), without going over (not too long).
10 8 6 4 2

Creativity
Presentation was creative/innovative while demonstrating a good understanding of topic.
10 8 6 4 2

Total ______ /100 (worth 20%)
8.2.3 RUBRIC for grading discussions on assigned readings

The core of the grade is based on how you analyzed the various parts of the paper to assess its strengths and weaknesses (accounting for your level of knowledge). Considering both strengths and weaknesses generally allows a more thorough and more persuasive critique by presenting a balanced view. The grade is based on the following criteria:

1. The variety of aspects you analyzed and critiqued (coverage, 2 pts).
2. Your ability to find and present both strengths and weaknesses (balance, 2 pts).
3. How well you supported your arguments (2 pts).
4. Organization: Critical reviews should be coherent and allow the reader to easily follow your arguments. Pay attention to reasoning and transitions between sentences (2 pts).
5. Typos/grammatical errors should be avoided (2 pts)

Total ____/10 (each discussion on an assigned reading is worth 2% for a total of 20%)

Note: The way you summarized the paper and moderated the discussion when you were the assigned discussion leader will be weighed into the final mark for this course segment. However, you are expected to be equally well prepared for all discussions.

Some questions you might consider (of course, not all are appropriate for every paper):

✓ Did the title adequately convey the main subject or message of the paper?
✓ What was the main objective/purpose of the research, study or work? Did the author(s) meet this objective?
✓ As far as you know, did the paper describe new work, new results, or a new theory or interpretation? Or did the paper provide valuable confirmation of previously published information?
✓ Were the different sections of the article well balanced? Did the paper read well?
✓ Were the methods sufficiently detailed to understand or replicate the study? How adequate were the methods and the controls used?
✓ Who was the intended audience? Was the writing style appropriate for this audience?
✓ Did the author(s) properly define any jargon they used?
✓ Were illustrations, tables or figures used to good effect? Did they complement the text? Were they the best method to present data or were they unnecessary or overly complex?
✓ Were the conclusions justified? Was interpretation adequate, or perhaps not fully warranted by the data (e.g. important omissions or loose generalisation).
✓ Did the author(s) suggest areas for further research or discussion?
✓ What was the size of the reference section? Were recent references included? Were references used for both support and rebuttal? Was proper respect given to pioneer work on the topic?
✓ What did you take out of this paper? Any suggestions for future work in this field?