University of Victoria - Department of Geography

COURSE OUTLINE

GEOG424: Field Studies in Coastal Geomorphology

Instructor: **Dr. Ian J. Walker**

Office hours: **M 9am – 12pm OR other times by appointment**

Lectures: **M, 10am – 12pm DTB B215** (subject to change, specified weeks only as below)

Objectives: This course offers an advanced, project-based experience for senior students in coastal geomorphology. The course involves a few on-campus seminars, a multi-day field trip, and an independent research project. Seminars are designed to engage students in reviewing key theories and literature about coastal processes & landforms of interest. The research project involves student groups in fieldwork &/or data analyses on a specific geomorphic process &/or site of interest. The field trip provides an opportunity for students to learn experientially about coastal systems and, as time permits, conduct work relevant to their projects. Areas of study will span nearshore to backshore environments, wave, tidal, fluvial/estuarine, and aeolian processes. The Departmental on-island field trip fee will be applied.

Prerequisites: GEOG376; permission of the department.

Field Trip: A multi-day field trip to several sites on Vancouver Island during the February Reading Break. Details discussed in class. The field trip fee will be used to offset travel and accommodation costs.

Recommended Readings: Students will be provided with a state-of-the-science review chapter from a major reference work (Sherman et al. 2013 from the *Treatise on Geomorphology*), which provides an extensive review of all aspects of coastal geomorphology. Other leading texts will also be put on library reserve and should be consulted for more foundational information. Additional reading & review of peer-reviewed research literature (e.g., journal articles) is also required for projects.

- Sherman, D.J. (ed) et al. (2013). Volume 10: Coastal Geomorphology. In: Shroder (ed) (2013) Treatise on Geomorphology. Elsevier, 414 p. Available as PDF.

- Davidson-Arnott, R.D.A, (2010). *Introduction to Coastal Processes & Geomophology* (1/e). Cambridge University Press, 456 p. (ISBN-10: 0521696712). A copy will be on course reserve.

- Masselink, G., Hughes, M.G., and Knight, J. (2011). *Introduction to Coastal Processes & Geomophology* (2/e). Hodder, 288 p. (ISBN-10: 0340764112). First edition on reserve.

Course evaluation scheme:

Research review seminar	20%
Research project	80%
- Project poposal	20% (10% paper + 10% presentation)
- Final project	60% (40% paper + 20% presentation)

Details on requirements for each component are provided below.

**NOTE: The field trip is mandatory and students are required to complete all components of the course and obtain a passing grade in the project to obtain credit.*

Course policies and important notes:

1. **Lateness policy:** A deduction of 25% of the total mark per day will be applied to late submissions. Concessions will be made only for extenuating circumstances with proper medical or counselling documentation provided.

2. **Academic Integrity:** Students should review the UVic Policy on Academic Integrity (http://web.uvic.ca/calendar2013/FACS/UnIn/UARe/PoAcI.html), which defines key violations such as plagiarism, multiple submissions, falsifying materials, etc. *Note that all written products will be submitted for originality assessments on Turnitin.com as a means to discourage plagiarism.*

3. **Grading scale:** according to the Dept. of Geography guidelines

Passing Grades	***Grade Point Value***	***Percentage****	***Description***
A+ A A-	9 8 7	90-100 85-80 80-84	**Exceptional, outstanding and excellent** performance earned by work which is technically superior, shows mastery of the subject matter, and in the case of an A+ offers original insight and/or goes beyond course expectations. Normally achieved by a minority of students.
B+ B B-	6 5 4	77-79 73-76 70-72	**Very good, good and solid** performance earned by work that indicates a good comprehension of the course material, a good command of the skills needed to work with the course material, and the student's full engagement with the course requirements and activities. A B+ represents a more complex understanding and/or application of the course material. Normally achieved by the largest number of students.
C+ C	3 2	65-69 60-64	**Satisfactory, or minimally satisfactory** performance earned by work that indicates an adequate comprehension of the course material and the skills needed to work with the course material and that indicates the student has met the basic requirements for completing assigned work and/or participating in class activities.
D	1	50-59	**Marginal** performance earned by work that indicates minimal command of the course materials and/or minimal participation in class activities that is worthy of course credit toward the degree.

**The grading scale for the evaluation of course achievement at the University of Victoria is a percentage scale that translates to a 9 point GPA/letter grade system. The 9 point GPA system is the sole basis for the calculation of grade point averages and academic standing. Standardized percentage ranges have been established as the basis for the assignment of letter grades. The percentage grades are displayed on the official and administrative transcripts in order to provide fine grained course assessment which will be useful to students particularly in their application to graduate studies and for external scholarships and funding. Comparative grading information (average grade [mean] for the class), along with the number of students in the class, is displayed for each course section for which percentage grades are assigned. (Excerpt from the current UVic Calendar).*

GEOG424 Lecture Schedule (Subject to change)

Date	Topic	*Notes*
M Jan. 12	Introduction	*General overview of course & deliverables. Discussion of field trip. Form groups for projects.*
M Jan. 26	Research review seminars	*Group presentations*
M Feb. 2	Group project proposals	*Written proposal due in class followed by group presentations.* *Brief discussion of field trip.*
8-13 Feb.	Multi-day field trip (subject to change)	*Come prepared for inclement field conditions. Itinerary, gear, etc. will be discussed in advance.*
M Mar. 2	Progress reports	*Group progress report presentations followed by question period.*
M Mar. 30	Research projects & presentations	*Final papers due in class followed by group mini-conference presentations.*

"The University of Victoria is committed to promoting, providing and protecting a positive and safe learning and working environment for all its members."

RESEARCH REVIEW SEMINAR (20%)

Each group will prepare a review seminar presentation (20%) that reviews fundamental concepts and scientific literature on a general topic in coastal geomorphology broadly related to eventual research projects. The objective is for groups to delve into both fundamental sources (e.g., texts, course materials) AND research literature to provide an overview of key concepts, models, theories, etc. on a general topic of interest. This could include (but not limited to): coastal erosion, bar systems, beach types, beach-dune systems, sediment transport processes, cusps, spits, barriers, etc. Groups should engage the audience about key processes and/or landforms of interest (i.e., as if they were teaching them about the subject matter at an upper 3/4th year level).

Each group will be given equal time (10-20 minutes, depending on the number of groups) to present their seminar using Powerpoint. Groups should discuss the focus and structure of their seminars with me in advance.

Keep in mind that a seminar is not a 'lecture', so be innovative and think of ways you can engage the class effectively (e.g., assigned readings, handouts, case studies, demonstrations, etc.). I will be available to consult on readings, focus, methods, etc.

Seminars will be graded on: i) presentation style & effectiveness of delivery, ii) content accuracy & clarity of materials, iii) level & effectiveness of class engagement, iv) stimulation and handling of questions.

GROUP RESEARCH PROJECT (80%)

Introduction:

Combined, the project proposal (20%) and final paper & presentation (60%) are worth 80% of your final grade. The project is designed with the following learning objectives in mind:

i) to gain experience researching topic of interest in coastal geomorphology. This encourages creativity, group work, resourcefulness, experiential learning & knowledge building pertinent to the course objectives.

ii) to prepare a research proposal that surveys peer-reviewed literature to identify the current state of knowledge, methods (analytical, field, etc.) used, and supporting knowledge on which you can build your study. This engages you in the process of knowledge synthesis and application that is useful for advanced graduate studies or careers in consulting or government research.

iii) to present your results as both a written research paper & a formal conference-style presentation. This builds key skills in technical writing, presentation delivery, and managing group tasks and deliverables required for advanced study or other career pursuits.

iv) to work in a team. This aims to disperse the workload, share the responsibilities & develop 'real-world' group work skills.

Project ideas: Some suggested topics of interest include (but are not limited to):

- beach sediment volume & morphodynamic responses during a tidal cycle or following erosion
- tidal creek discharge, sediment load and geomorphic interactions
- large woody debris (LWD) influence on beach-dune systems
- investigation of coastal dunes or active bluff systems and shoreline changes (erosion and/or progradation) using aerial photography, site surveys &/or other 'dating' methods (e.g., dendrochronology)
- seasonal beach-dune morphodynamics and/or sediment budgets/volumes from long-term survey monitoring, historical aerial photography, and/or LiDAR
- implementation and effectiveness of coastal erosion control structures

Groups:

- *Work in groups of 2 or 3 (depends on class size). Discuss topics/objectives with me early.*
- *All members will receive the same grade. Work together & be fair in sharing the load!*

Components & Evaluation:

1. **Project proposal** (20%). Groups will prepare a written proposal (10%, 2-3p. + annotated bibliography) & give a 10-15 min. presentation (10%) on the context (lit review), objectives & proposed methods of their project. Details below.
2. **Research project** (60%) Each group will prepare a research paper (40%, 15-20 p. max, 12 point font, plus references) and give a 10-15 min. conference-style presentation (20%), both due at the end of the semester. Details below.

1. **PROJECT PROPOSAL (20%)**

Your research proposal should include ALL of the following components. Be sure to cite research works as needed in proper journal citation formatting style (see ESPL or Geomorphology Journals for examples… Tao et al. 1991, etc.).

(a) **Title:** clearly describes the topic of your project. Be specific. For example, "Sand dunes near Victoria" is neither effective nor informative. Be detailed, informative and make it interesting. "Morphodynamic & sediment mass balance responses of foredunes at Wickaninnish Dunes, Ucluelet, BC"… now that's interesting!

(b) **Research Context:** In a few paragraphs (~1 page) explain the context, objectives & proposed methods involved with your project. In doing so, be sure to review and refer to research literature on the topic that helps indicate the opportunity or potential contribution that such a study could provide. Be sure to provide:

i. a concise explanation the general context/focus of your research project and (avoiding first person) its rationale (i.e., why your group chose this project, what about it is interesting/relevant/novel?).

ii. an elaborated statement on the methodology you will use for the project, which should include more elaboration on specific 'methods'. For instance, will you choose a field-based project, geomatics study, etc. and by what means/methods/analyses will you address your research objectives (stated in the next section). In other words, the how & why of your research.

iii. a statement on the importance or broader relevance of studying this topic from a geomorphic perspective. Perhaps provide some global or regional context for this or identify a distinct research gap or applied relevance as stated in the literature.

(c) **Purpose & objectives:** simply and clearly indicate the broader purpose or focus of your project and how you will attempt to address or present this via specific research objectives or hypotheses. See examples in research papers. Often, concise purpose statement (1 or 2 sentences) followed by a numbered list of objectives. For example (and this one is fairly elaborate):
"The purpose of this project is to examine and describe the geomorphic history and contemporary morphodynamics in the Big Coast Dunes complex. This will be accomplished via the following objectives: i) to provide a detailed geomorphic map based on field surveys and GIS analyses of historic aerial photographs that illustrates the distribution of dunes in the study region, ii) to interpret dune type, extent and changes based on interpretation of historical aerial photographs since 1930, iii) to characterize and explain recent re-activation of the dunes using on-site observations, local accounts, and examination of recent trends in aeolian activity using historical climate data."

(d) **Annotated bibliography**: a summary (400 words max. each) of peer-reviewed journal articles relevant to your topic. Two from each group member is required. Examples below:

- *provide bibliographic reference for each article in proper journal referencing format.*
- *summarize in your own words. Do NOT paraphrase or copy abstract or conclusions! Review key points/results of the paper AND demonstrate how it is relevant to your research topic/project. Stick to the 400 word limit.*
- *include the actual COVER PAGE for each*
- *NO WEBPAGES please (thousands of articles await you!), see me for assistance*
- Suitable journals: *Earth Surface Processes & Landforms, Geomorphology, Canadian Journal of Earth Sciences, J. Geophysical Research (Earth Surface), J. Coastal Research,* etc.

How to find them? The UVic Library website 'Search Everthing' module is a useful starting point and, by clicking the "Show peer-reviewed articles only" Tab, can quickly list a bunch of proper (i.e., refereed) scientific publications. In addition, there are other online databases such as GEOREF and ScienceDirect that are quite good. Finally, Google Scholar is a very effective search engine. I can also be of direct assistance (by appointment).

Examples of Annotated Bibliographies:

Wolfe, S.A. and David, P.P. (1997). Parabolic dunes: Examples from the Great Sand Hills, southwestern Saskatchewan. *Canadian Geographer* 41: 207-213.

This article describes the geomorphic history and modern processes acting within the parabolic dune systems of the Great Sand Hills region of Southern Saskatchewan. Wolfe & David (1997) provide a geomorphic map of the region which we will modify and enhance for our project to include the dunes in our area. We will do this by digitizing airphotos and topographic maps of our region and extending the boundaries of Wolfe & David's map. Though these dunes are located north of our study region, the general climate, history and modern processes acting at our site are comparable.

Lemmen, D.S., Vance, R.E., Wolfe, S.A. and Last, W.M. (1997). Impacts of future climate change on the southern Canadian prairies. *Geoscience Canada* 24: 121-133.

This paper presents palaeoenvironmental evidence from pollen records and thermoluminescence dating that suggests that parabolic dune systems of the prairies are not relict features from the hypsothermal period that have since been stablizing. Rather, Lemmen et al. (1997) suggest that many prairie dunefields have undergone phases of re-activation and stabilization in response to drought cycles that are common in the prairies. They suggest that prairie dunes, like those at our study site, may re-activate in the future with climate change-induced drying and overgrazing in the region.

Wolfe, S.A. (1997). Drought or climate change? Impact of increased aridity on sand dune activity in the Canadian Prairies. *Journal of Arid Lands* 36: 421-432.

Wolfe (1997) describes how as increased aridity associated with shorter-term drought phases and not longer-term climate change may be sufficient to cause re-activation of parabolic dune systems in the Canadian Prairies. This is of relevance for our project because the author provides a conceptual model of feedbacks and interactions between climate change, over grazing, vegetation decline and dune re-activation. We will use this model as an example of what could happen in our area under prolonged drought and overgrazing. In particular, we may modify Wolfe's (1997) figure 18b, which shows a plot of precipitation/potential evaporation as an indicator of aridity and dune mobility.

(e) **Timeline & Responsibilities:** Provide a brief timeline for accomplishing tasks for your research & project tasks. Indicate who will be responsible for each (e.g., library research, data gathering, analysis, presentation production). Show me that you have thought on how to get the jobs done *equally, thoroughly & not at the last minute!!* Plan ahead especially given your other commitments as it takes time to order and analyse data, write and prepare your papers and presentations, etc.

- *Consider also that fieldwork will either occur on your own time OR during the class field trip during Reading Break. Always have a backup plan should your fieldwork not pan out!!*

(f) **Evaluation:** The proposal & related presentation are worth 20% of your grade and will be evaluated based on the following criteria.

- *clarity & effectiveness of the title*
- *research context (i.e., how is the study situated in the broader knowledge/research literature)*
- *conciseness & focus of the purpose, objectives*
- *clarity, rationale & feasibility of methods*
- *linkage to & effective use of peer-reviewed literature (journal articles) via annotated bibliography*
- *quality & presence of required components including article title pages, annotated biblio, etc.*
- *indication of planning, preparation & equitable delegation of tasks*

2. RESEARCH PROJECT (80%)

a) Research paper (60%): will contain most of the following components, structured similar to a research journal article. From this, each group will prepare a PowerPoint talk that draws upon the components they see as necessary. Please prepare your paper with the format and referencing style of the journal Geomorphology (http://www.journals.elsevier.com/geomorphology/). Components:

i) Title: effectively describes the specific focus of your project

ii) List of Contributors: list all members of your group under the title

iii) Abstract: a concise (250 word) summary of your report stating purpose, objectives and main details/results of what is presented including conclusions & contributions made.

iv) Introduction: describes general focus, purpose & objectives of your report and presents a brief review of related research literature. As outlined in your proposal, provide some paragraphs that review the research context from the literature surrounding your topic. To do so, be sure to referring to at least 6-8 research articles (perhaps those from your annotated bibliography). This frames your project in terms of what has been done. Be sure to properly cite ideas expressed in these works. See me for clarification or any journal article for examples of citation.

v) Methods and data: state rationale and approach(es) clearly &/or any sources of data used (e.g., airphotos, water levels, topographic surveys, climate data, etc.). Do not interpret anything (data, results) but consider that the reader/audience has no idea of what/how you did your work, so explain so the reader can follow exactly what you did and understand the rationale, limitations, decisions made, etc.

vi) Study site: using a proper map to show the broader study region, describe your specific study site. See any field research article for examples. Show pictures or diagrams of your methods, as appropriate.

vii) Results or summary of key findings from reviewed literature/case studies. At this point, you do not interpret them, just present and explain them. Interpretation occurs in the discussion section. Use maps, tables, statistics, graphs, photos, etc. to convey your results concisely and effectively.

viii) Discussion: In the body of your project, interpret what each of your results components 'means' in the context of other research findings/literature. Consider also how your results may converge on 3-5 points of discussion or 'integrated' ideas/issues/findings that emerge. Feel free to use sub-headings to structure these.

ix) Conclusion: a brief (2-3 paragraph) summary of main findings/points of your project. This can be done using bullet points & a leading paragraph. The leading paragraph should explain how you have addressed the purpose & objectives stated in the intro. Finish with a statement on the relevance & application of geomorphic research on features/processes like those you have studied.

x) References: a bibliography of all cited articles/sources including maps, government documents, etc. See *Geomorphology* for proper citation & bibliography formatting.

b) Conference-style presentation: Each group will give a 10-20 min. oral presentation using PowerPoint, etc. to present your research context, results & discussion. Similar to a conference, talks will be moderated for time & a few minutes will be allowed for questions.

Suggestions: i) try to use no more than 1 slide/minute of your talk, ii) you may not have time to cover everything in detail, so focus on key findings, iii) practice, practice, practice & time yourselves! I will also provide an example of a recent talk for your viewing pleasure!