BIOL 4405 Landscape Ecology
Course Outline

A. CONTACTS

Instructor: Dr. Yolanda Wiersma, Associate Professor
Room: SN 4099
Phone: 864-7499
Email: ywiersma@mun.ca
Office hours: If my door is ajar, knock and ask!
PLEASE NOTE: I'm **not** available on Tuesdays.

B. COURSE OBJECTIVES

Students will gain an understanding of the field of landscape ecology. They will be able to describe the main theories and major developments in the field. In addition, they will gain skills in quantification of landscape patterns and in analysis of the relationships between spatial patterns and spatial processes. Finally, students will become familiar with research applications of landscape ecology theory.

C. COURSE FORMAT

Lectures: Monday and Wednesday 9:00-9:50 a.m. SN3058
Seminar: Friday, 9:00-9:50 a.m. SN 3058

D. IMPORTANT DATES

Friday, January 5: First Day of Class
Monday, February 19-Friday, February 23 – **no classes** (winter break)
Thursday, March 1 –last day to drop without academic penalty
Friday, March 30: Good Friday – **no class**
Friday, April 6: Last day of lectures

E. COURSE OUTLINE

Unit 1 (weeks 1-4): What is a landscape? What is landscape ecology?

Topics covered: key concepts, biotic and abiotic drivers of pattern, linking ecology pattern and process

Unit 2 (weeks 5-6): Tools in Landscape Ecology

Topics covered: remote sensing, GIS, landscape metrics, simulation modelling, spatial statistics

Unit 3 (weeks 7-10): Applications in Landscape Ecology

Topics covered: species distributions in space and time, change detection, landscape and urban planning, forestry management, agriculture, protected areas design, ecosystem management

Unit 4 (week 11-12): Novel Landscapes

Topics covered: seascapes, soundscapes, micro-landscapes, *in silico* landscapes

F. EVALUATION

***** All assignments are to be submitted as PDF files[1] via D2L*****
Name files as: <surname>_<assignment name>.pdf
(0.5 mark penalty for failing to submit as a PDF with correct filename)

Participation in seminar throughout the term	25%
Adopt-a-landscape assignments	
Description of your landscape (due Monday January 29)	15%
Key concepts essay (due Monday February 26)	20%
Landscape ecology tools assignment (due Monday March 19)	15%
Future landscape paper (due Friday April 6, with option for extension into exam period):	25%

Participation

Every Friday, the class will be run as a seminar. There will be assigned readings for each seminar which you will be expected to discuss in the Friday slot. In order to receive participation marks it is **CRITICAL** that you complete the assigned readings each week and be prepared to actively discuss them with the group; providing critical commentary and synthesis. In addition, you are each required to provide a short 3-4 sentence write up to the instructor at the **BEGINNING** of class that outlines some key questions that arose for you from reading the article, or outlines discussion points you plan to make. **Write ups that land on my desk after 9:00 a.m. will not be accepted.** These will be used to partially evaluate participation and to take into consideration that with a larger class, not everyone is able to actively speak each class. *However, ONLY submitting a written discussion point and rarely or never speaking out in class will only earn you a maximum of 10 out of 25 marks for your seminar participation grade*.

Adopt-a-landscape Assignments

The remainder of the assignments will be centered on a landscape that you choose to study in depth throughout the term (see details on separate hand-out). Each student will carry out the same assignment, but in each case specific details and examples should be drawn from the landscape that you choose at the beginning of the term.

G. RECOMMENDED TEXT (NOTE: NOT REQUIRED, BUT IT MAY PROVIDE GOOD BACKGROUND)

Landscape Ecology in Theory and Practice (M.G. Turner, R.H. Gardner and R.V. O'Neill). Springer-Verlag, New York, 2001 (ISBN: 0-387-95123-7).

****** It is HIGHLY recommended that you bring a laptop or tablet (with internet connection) to each Monday and Wednesday class (for interactive exercises)******

[1] Unless otherwise noted

H. SEMINAR READING ASSIGNMENTS

Seminar date	Unit	Theme(s)	Seminar Paper(s)
January 12	1	Introduction, pattern/process	Turner (2005) & Wu and Hobbs (2002)
January 19	1	Biotic/abiotic drivers	Hanan et al. (2010)
January 26	1	Disturbance	Romme et al. (2011)
February 2	1	Scale	Wiens (1989)
Feb. 9	2	Remote sensing & GIS	Egberth et al. (2017) & Béliveau et al. (2017)
Feb. 16	2	Landscape metrics and spatial statistics	Li and Wu (2004) & Yuan et al. (2015)
Feb. 23			**No reading – Winter Break**
March 2	3	Applications in forestry	San-Miguel et al. (2017)
March 9	3	Applications in species distribution modelling	Le Roux et al. (2017)
March 16	3	Applications in in urban studies and in conservation	Pickard et al. (2017) & Wiens (2009)
March 23	4	Microlandscapes	Wiens and Milne (1989) & Bowker et al. (2014)
March 30			**No reading – Good Friday**
April 6	4	Seascapes & Soundscapes	Hitt et al. (2011) & Pijanowski et al. (2011)

Seminar Reading List (Alpha-order) – *(PDFs of articles are on D2L)*

Béliveau, M., D. Germain, A.-N. Ianăş. 2017. Fifty-year spatio-temporal analysis of landscape changes in the Mont Saint-Hilaire UNESCO Biosphere Reserve. *Enviornmental Monitoring and Assessment* 189, 215.

Bowker, M.A., F.T. Maestre, D. Eldridge, J. Belnap, A. Castillo-Monroy, C. Escolar and S. Soliveres. 2014. Biological soil crusts (biocrusts) as a model system in community, landscape and ecosystem ecology. *Biodiversity and Conservation* 23:1619-1637

Egberth, M., G. Nyberg, E. Næsset, T. Gobakken, E. Mauya, R. Malimbwi, J. Katani, N. Chamuya, G. Bulenga, H. Olsson. 2017. Combining airborne laser scanning and Landsat data for statistical modeling of soil carbon and tree biomass in Tanzanian Miombo woodlands. *Carbon Balance and Management* 12:8 DOI 10.1186/s13021-017-0076-y

Hanan, E.J., M.S. Ross, P.L. Ruiz, J.P. Sah. 2010. Multi-scaled grassland-woody plant dynamics in the heterogeneous marl prairies of the Southern Everglades. *Ecosystems* 13: 1256-1274.

Hitt, S., S.J. Pittman, R.S. Nemeth. 2011. Diel movements of fishes linked to benthic seascape structure in a Carribbean coral reef ecosystem. *Marine Ecology Progress Series* 427: 275-291.

Le Roux, M., M. Redon, F. Archaux, J. Long, S. Vincent and S. Luque. 2017. Conservation planning with spatially explicit models: a case for horseshoe bats in complex mountain landscapes. *Landscape Ecology* 35: 1005-1021.

Li, H. and Wu, J. 2004. Use and misuse of landscape indices. *Landscape Ecology* 19(4): 389-399.

Pickard, B.R., D. Van Berkel, A. Petrasova and R.K. Meentemeyer. 2017. Forecasts of urbanization scenarios reveal trade-offs between landscape change and ecosystem services. Landscape Ecology 32: 617-634.

Pijanowski, B.C., A. Farina, S.H. Gage, S.L. Dumyahn and B.L. Krause. 2011. What is soundscape ecology? An introduction and overview of an emerging new science. Landscape Ecology 26: 1213-1232.

Romme, W.H., M.S. Boyce, R. Gresswell, E.H. Merrill, G.W. Minshall, C. Whitlock and M.G. Turner. 2011. Twenty years after the 1988 Yellowstone fires: lessons about disturbance and ecosystems. *Ecosystems* 14: 1196-1215.

San-Miguel, I., D.W. Andison and N.C. Coops. 2017. Characterizing historical fire patterns as a guide for harvesting planning using landscape metrics derived from long term satellite imagery. *Forest Ecology and Management* 399: 155-165.

Turner M.G. 2005. Landscape ecology in North America: past, present and future. *Ecology* 86: 1967-1974.

Wiens, J.A. 1989. Spatial scaling in ecology. *Functional Ecology* 3: 385-397.

Wiens, J.A. and B.T. Milne. 1989. Scaling of 'landscapes' in landscape ecology, or, landscape ecology from a beetle's perspective. *Landscape Ecology* 3:87-96

Wiens, J.A. 2009. Landscape ecology as a foundation for sustainable conservation. *Landscape Ecology* 24: 1053-1065.

Wu, J. and R. Hobbs. 2002. Key issues and research priorities in landscape ecology: an idiosyncratic synthesis. *Landscape Ecology* 17: 355-365.

Yuan, F., Wu, J., Li, A., Rowe, H., Bai, Y., Huang, J., and Han X. 2015. Spatial patterns of soil nutrients, plant diversity, and aboveground biomass in the Inner Mongolia grassland: before and after a biodiversity removal experiment. *Landscape Ecology* 30: 1737-1750.

COURSE POLICITES AND LEGAL STUFF

Course policies

It is my expectation that in a fourth year course, we will have a mutually rewarding learning environment. You do not "have" to take this course, so I am assuming you are here because you have an interest in the topic. Thus, I expect you will be engaged with the material, keep up with the readings and assignment and participate in class discussions.

I will commit to starting on time. I expect you to come on time. This is especially critical on Fridays – if you do not have your seminar summary note on my desk by 9:00, your participation grade will be affected.

I will keep the D2L site up-to-date, and respond to email promptly M-F.

I expect you to respect your classmates; keep conversations focused to the group and cell phones and other distractions turned off.

Extensions to assignments can be considered with advance notice and due cause. Missed assignments because you were sick on the due date will result in a zero. Missed presentations with documentation will be rescheduled.

University policies

1. Grading system

The following grading system will be adhered to (as described in section 4.8 of the Memorial University Undergraduate Calendar)

Letter Grades	**Numeric Grades**	**Points Per Credit Hour**
A	80-100%	4
B	65-79%	3
C	55-64%	2
D	50-54%	1
F	below 50%	0

"A" indicates excellent performance with clear evidence of:
  - comprehensive knowledge of the subject matter and principles treated in the course,
  - a high degree of originality and independence of thought,
  - a superior ability to organize and analyze ideas, and
  - an outstanding ability to communicate.
- "B" indicates good performance with evidence of:
  - substantial knowledge of the subject matter,
  - a moderate degree of originality and independence of thought,
  - a good ability to organize and analyze ideas, and
  - an ability to communicate clearly and fluently.
- "C" indicates satisfactory performance with evidence of:
  - an acceptable grasp of the subject matter,
  - some ability to organize and analyze ideas, and
  - an ability to communicate adequately.
- "D" indicates minimally acceptable performance with evidence of:
  - rudimentary knowledge of the subject matter,
  - some evidence that organizational and analytical skills have been developed, but with significant weaknesses in some areas, and
  - a significant weakness in the ability to communicate.
- "F" indicates failing performance with evidence of:
  - an inadequate knowledge of the subject matter,
  - failure to complete required work,
  - an inability to organize and analyze ideas, and
  - an inability to communicate.

2. Academic Integrity

This course adheres to the standards to Academic Integrity as outlined in Section 4.11 of the Undergraduate Calendar (http://www.mun.ca/regoff/calendar/sectionNo=REGS-0748#REGS-0749), described in part below:

Academic offences shall be deemed to include, but shall not be limited to, the following:

- Cheating on examinations or any other tests, theses, assignments, work term reports, projects or internship reports: includes copying from another student's work or allowing another student to copy from one's own work; consulting with any unauthorized person during an examination or test; using unauthorized aids; or knowingly recording or reporting false empirical or statistical data. The work referred to includes examinations, theses, assignments, work term reports, projects, internship reports, or any other tests which are to be used in judging the student's performance in a course or program of study, or on any special tests which the University may offer.
- Impersonating another student or allowing oneself to be impersonated: includes the imitation of a student or the entrance into an arrangement with another person to be impersonated for the purposes of taking examinations or tests or carrying out laboratory or other assignments.
- Plagiarism: is the act of presenting the ideas or works of another as one's own. This applies to all material such as essays, laboratory reports, work term reports, design projects, seminar presentations, statistical data, computer programs and research results. The properly acknowledged use of sources is an accepted and important part of scholarship. Use of such material without acknowledgment is contrary to accepted norms of academic behaviour. Information regarding acceptable writing practices is available through the Writing Centre.
- Theft of examination papers or other material: includes obtaining by any improper means examination papers, tests, or any other such material.
- Use and/or distribution of stolen material: includes the use of material which the student knows to have been improperly obtained and/or the distribution of such material.
- Submitting false information: includes falsifying academic forms or records, submitting false credentials, medical or other certificates, or making a false, misleading or incomplete declaration to the University.
- Submitting work for one course or work term which has been or is being submitted for another course or work term at this or any other institution without express permission to do so: includes the presentation of an essay, report or assignment to satisfy some or all of the requirements of a course when that essay, report, or assignment has been previously submitted or is concurrently being submitted for another course without the express permission of the professor(s) involved.