Estimating Demographic Parameters from Marked Animals
Fall Semester 2012

Instructor: Dr. Paul M. Lukacs
WILD 595 section 4 – 4 credits
Prerequisites: Calculus, statistics

Schedule:	Lecture:	Tuesday, Thursday	9:40- 11 AM	CHCB 452
	Lab:	Thursday	12:10-2 PM	Stone 107

Office Hours (FOR 103b): Tuesday, Thursday 11:10-12 or by appointment
(paul.lukacs@umontana.edu)

Readings (to be read before class):
Gentle Introduction to Mark – online, chapters noted in brackets below []
http://www.phidot.org/software/mark/docs/book/
Primary literature as assigned

Software
R www.r-project.org
Mark www.warnercnr.colostate.edu/~gwhite/mark/mark.htm

August	28	Introduction, Sampling
	30	Maximum Likelihood Estimation [Ch. 1], Burnham et al. (1987), p. 2-25.
	Lab	Sampling, optimization and likelihood
September	4	Dead recovery models (band recoveries) [Ch. 2, 3, 8]
	6	Live-resight models (Cormack-Jolly-Seber) Lebreton et al. (1992)
	Lab	European dippers, sage grouse
	11	Incorporating Scientific Questions / Including Covariates [Ch. 6]
	13	Incorporating Scientific Questions / Including Covariates
	Lab	Dippers, grouse revisited
	18	Role of model selection in Science. Burnham & Anderson (2001)
	20	Role of model selection in Science
	Lab	Hen clams
	25	Closed-population models [Ch. 14] Otis et al. (1978)
	27	Closed-population models Robust Design models / Exam 1
	Lab	Analysis review
October	2	Robust Design models [Ch. 15] Kendall et al. (1997)
	4	Robust Design models
	Lab	Hares, Taxicabs, Goldeneye

	9	Joint Live-Dead Models [Ch. 9] Burnham (1993), Barker (1997)
	11	Variance estimation, derived parameters, Delta method, Profile likelihoods, bootstrapping [App B]
	Lab	Example in R
	16	TWS Conference. Link et al. (2002)
	18	Bayesian Inference / Fitting models with MCMC
	Lab	MCMC in Mark and R
	23	Bayesian Inference / Fitting models with MCMC
	25	Random Effects and Variance Components
	Lab	MCMC in Mark and R
	30	Model Selection, Bayesian vs. Likelihood
November	1	Model fit / Exam 2
	Lab	Review
	6	Multi-State Models as a Unifying Theory of Mark-Recapture. [Ch. 10], Lebreton & Pradel (2002), Dhondt (2002)
	8	Basic multistate models
	Lab	
	13	Movement and State Change. Doligez et al. (2002)
	15	Modeling transitions, what are the limits to complexity?
	Lab	Spawning suckers
	20	Discussion
	22	**Thanksgiving – no class/lab**
	27	Hazard rate / Cox models
	29	Known fate discrete time survival modeling [Ch. 16]
	Lab	Black ducks
December	4	Student presentations
	6	Student presentations
	10	Student presentations (10:10-12:00)

Grading: All exams will be take-home exams. Exams will be handed out at the end of class on a Thursday and will be due the following Tuesday at the beginning of class. Students are to work independently on exams and may not discuss the exam with anyone else.

Each student must analyze a capture-recapture data set of their choice (to be approved by the instructor). Students then must present their analysis and results as an oral scientific presentation. All analyses should be original. More details on the depth and structure of the analyses will be given in class. To be fair to all presenters and to maximize learning, students must attend all presentations. Ten points will be deducted for each presentation missed without an approved absence.

A short (5-10 minute) quiz will given at the start of class every Tuesday. Quizzes are intended to keep students focused on technical analysis details.

Computer lab exercises will not be graded. Students are encouraged to work together on the labs. If you do not understand a lab, please ask for help because the concepts will likely be on an exam.

Exam 1	25%
Exam 2	25%
Presentation	25%
Quizzes	25%

PLAGIARISM: Plagiarism will not be tolerated and will result in failing the course.

DROP DATES:

September 17th – This is the last day students can add or drop courses on Cyberbear, without a special fee or penalty.
September 18th – October 29th – Students can drop courses for any reason using a Course Drop Form during this period. Students will need to obtain signatures from the course instructor and then their faculty advisor. A $10 fee will be assessed and there is no refund of tuition or fees. A W will show up on their transcript. Students need to be aware that dropping courses may have implications for financial aid and/or health insurance.
October 30th – December 7th – Students can only drop courses if they document an unforeseen medical or personal emergency (see Course Drop Form for allowable reasons) during this period. Students must obtain signatures from the course instructor, then their faculty advisor, and then Associate Dean. A $10 fee is assessed and there is no refund of tuition or fees. A WP or WF will show up on their transcript, depending on performance thus far. Students need to be aware that dropping courses may have implications for financial aid and health insurance.