9. CONTACT HOURS PER WEEK:	2.5	LECTURE hours/weeks	1.5	LAB hours /week		PRACTICUM hours /week

Note: # of credits are based on contact hours. 800 minutes of lecture=1 credit. 2400 minutes of lab in a science course=1 credit. 1600 minutes in non-science lab=1 credit. 2400-4800 minutes of practicum=1 credit. 2400-8000 minutes of internship=1 credit. This must match with the syllabus. See http://www.uaf.edu/uafgov/faculty/cd/credits.html for more information on number of credits.

OTHER HOURS (specify type)	Students will spend additional time in completing homework assignments. This non-contact time will vary by students.

10. COMPLETE CATALOG DESCRIPTION including dept., number, title and credits (50 words or less, if possible):

GEOS 222: Fundamentals of Geospatial Sciences
3 Credits
Offered Fall

This course is an introduction to the principles and applications of geospatial science (remote sensing, GIS and GPS). Fundamental concepts include electromagnetic radiations, map projections, basic computer science, data formats, map-reading and map-making, etc. Practical exercises include field data collection using GPS, photo-interpretation, using image processing and GIS software packages. Prerequisites: GEOG 111 or GEOS 101 or permission of instructor. (2.5+1.5)

11. COURSE CLASSIFICATIONS: (undergraduate courses only. Use approved criteria found on Page 10 & 17 of the manual. If justification is needed, attach on separate sheet.)

H = Humanities		S = Social Sciences	

Will this course be used to fulfill a requirement for the baccalaureate core?	YES		NO	X

IF YES, check which core requirements it could be used to fulfill:

O = Oral Intensive, Format 6		W = Writing Intensive, Format 7		Natural Science, Format 8	

12. COURSE REPEATABILITY:

Is this course repeatable for credit?	YES		NO	X

Justification: Indicate why the course can be repeated (for example, the course follows a different theme each time).	
How many times may the course be repeated for credit?	TIMES
If the course can be repeated with variable credit, what is the maximum number of credit hours that may be earned for this course?	CREDITS

13. GRADING SYSTEM: Specify only one.

LETTER:	X	PASS/FAIL:	

14. PREREQUISITS

RESTRICTIONS ON ENROLLMENT L J5f any)

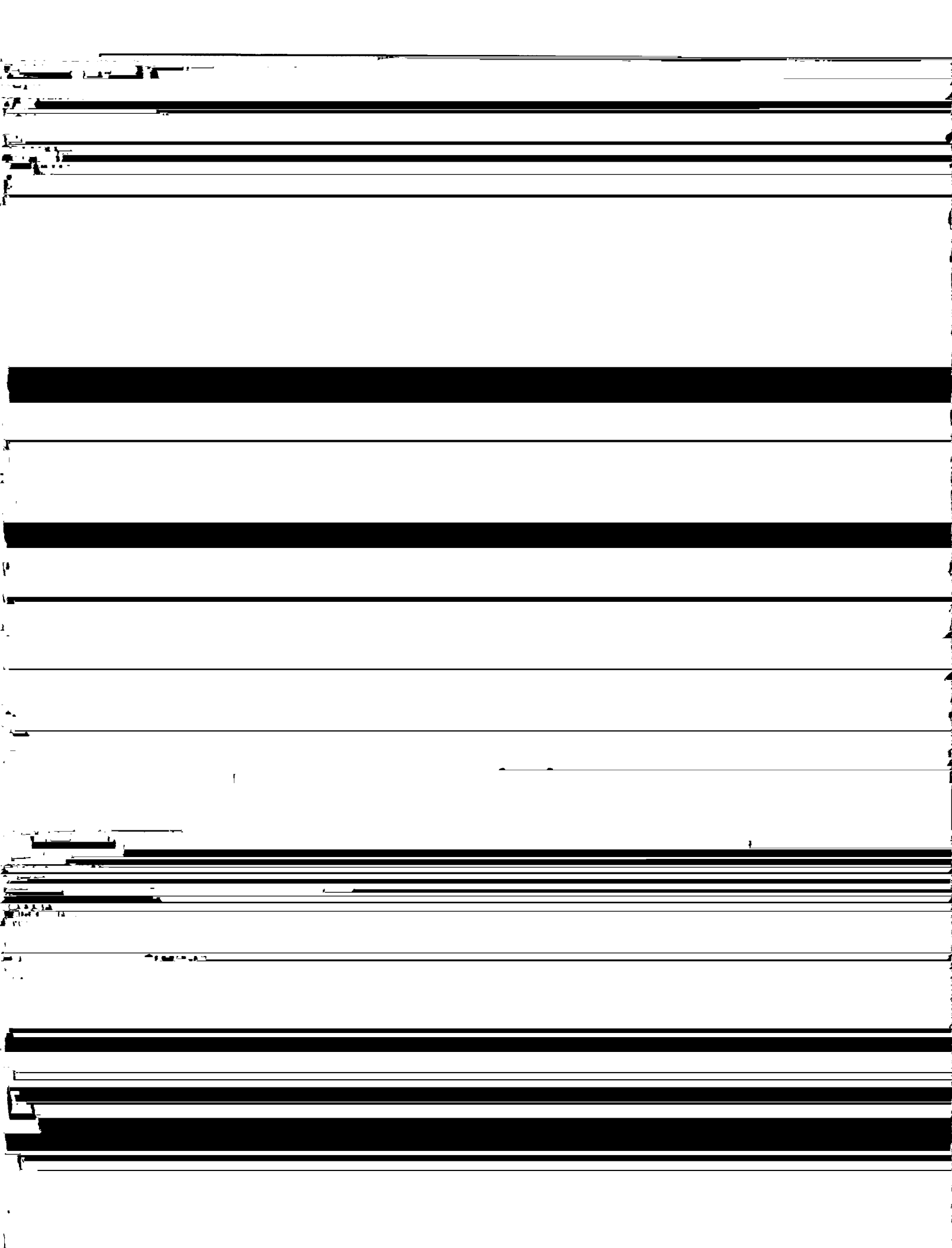
If yes, give semester, year, course #, etc.:

the nation.

21. POSITIVE AND NEGATIVE IMPACTS

Please specify positive and negative impacts on other courses, programs and departments resulting from the proposed action.

Positive Impacts:



Title:	Fundamentals of Geospatial Sciences
Number:	GEOS 222; GEOG 222
Credits:	3
Prerequisites:	GEOG 111 or GEOS 101 or permission of instructor
Location:	Lectures in WRRB Computer Lab; Room 004 Labs in WRRB Computer Lab; Room 004
Term:	Every Fall
Meeting time:	Lectures: Monday and Wednesday, 2.00 pm to 3.15 pm Lab: Monday and Wednesday, 3.15 pm to 4.00 pm

Dave Verbyla Office: O'Neill 366 Telephone: 907-4745553 Email: dlverbyla@alaska.edu Office hrs: ad hoc / by appointment	Donald Atwood Office: GI-206, UAF Telephone: 907-4747380 Email: dkatwood@alaska.edu Office hrs: ad hoc / by appointment
Anupma Prakash Office: WRRB-108E, UAF Telephone: 907-4741897 Email: prakash@gi.alaska.edu Office hrs: ad hoc / by appointment	Donald Atwood Office: GI-206, UAF Telephone: 907-4747380 Email: dkatwood@alaska.edu Office hrs: ad hoc / by appointment

Course text book: In this class we will follow the following text book (required):

Title : Physical Principles of Remote Sensing
Author : W. G. Rees
Edition : 2 edition (September 24, 2001)
Publisher : Cambridge University Press;
ISBN-10: 0521669480
ISBN-13: 978-052166948

Besides this required text book, you will have access to all class power point lecture materials, lab instructions, and data sets required for your lab assignments. These will be posted on the class website. You are also encourage to refer to other books, journals and magazines available at the UAF library (see list below).

Recommended introductory books in geospatial sciences:

Geographic Information Systems and Science, Second Edition, by Paul Longley, Michael Goodchild, David Maguire, and David Rhind, John Wiley & Sons and ESRI Press, 2005, 534 pages. ISBN: 047087001X.

GIS Fundamentals, 3rd Edition, by Paul Bolstad, Atlas Books, ISBN: 978-0-9717647-2-9.

Getting to Know ArcGIS Desktop, by Tim Ormsby, Eileen Napoleon, Robert Burke, Carolyn Groessl and Laura Bowde, ESRI Press, 2010, 604 pages. ISBN: 9781589482609.

Getting Started with Geographic Information Systems, 5th edition, Keith C. Clarke, Pearson Prentice Hall, 2010, 384 pages. ISBN-10: 0131494988 | ISBN-13: 978-0131494985.

Recommended journals and magazines:

International Journal of GIS
International Journal of Remote Sensing
Geoinformatics
Geospatial Solutions
GIS Development
GPS World

You are encouraged to make extensive use of UAF's investment in electronic journals. Familiarize yourself on the use of *Web of Science* and the *Goldmine* database of the Rasmuson library. There is a wealth of relevant literature there.

This course provides students with an intr

Student Learning Outcomes: By the end of the course, students will be able to

Understand the fundamental principles in remote sensing imaging and geospatial data integration and analysis.

Search and download relevant geospatial data required for a certain project/purpose.

Visually interpret in a qualitative way a variety of images (optical, infrared, SAR) taken from airborne and satellite platforms.

Collect and import GPS data using handheld recreational mode GPS units.

Project digital data in different projection systems.

Compose a simple cartographically sound map which integrates GPS data, with other geospatial data (vector data; raster maps and images).

Appreciate how geospatial data can be applied in the real-world for hazard assessment, resource allocation, emergency management, change detection, and

Your grades will be based on several factors as detailed below:

15%: Lecture and lab participation (see course policy above)
20%: Lab assignments. Most labs require that you complete the lab work in class and show the results to the instructors/TA or submit the answer sheet that accompanies the lab instructions. Make sure that you answer all questions and submit the responses by the indicated deadline (see course policy above).
15%: Mid-term. Your mid-term will comprise of short questions/ multiple choice answers that you will complete in class as a 'closed-book' exam.
30%: Two homework assignments due in late October and late November. Homework assignment will vary from year to year. Students need to answer the questions independently. Grading will be based on the completeness, comprehensiveness, and demonstrated understanding of the fundamental concepts and applications of geospatial sciences. Late work will be penalized as stated in the course policy.
20%: Final exam. Will be a combination of multiple choice answers and an essay type answer on the topics covered throughout the semester.

Grading index followed in this class is given below (Numerical GPA equivalence of Grades as per University Regulation R10.04.09 are indicated in parenthesis)

Should you have any special needs, please come and talk to us and we will work with you to accommodate your needs as best as possible. We will work with the UAF Office of Disability Services (208 WHITAKER BLDG, 474-5655) to provide reasonable accommodation to students with disabilities.

GEOS 222 / GEOG 222 Fundamentals of Geospatial Sciences		
Class Schedule		
Week 1	Lecture 1	Introduction to Geospatial Sc (RS and GIS)
	Lab 1	Google; NASA WW; Alaska Mapped
	Lecture 2	Map Interpretation
	Lab 2	Reading Maps
Week 2	Lecture 3	Map Projections
	Lab 3	Reprojecting maps (using a global shapefile)
	Lecture 4	Handheld GPS and Controls
	Lab 4	Geocaching and Measurement of controls
Week 3	Lecture 5	Waves and EM Spectrum
	Lab 5	Excel Lab with calculations
	Lecture 6	Active and Passive Sensors
	Lab 6	Visual study of images from active/passive sensors
Week 4	Lecture 7	Platforms (Satellites/Airborne)
	Lab 7	Globes/ Balloons
	Lecture 8	Perspectives and Scales (Nadir vs Oblique)
	Lab 8	Examples of perspectives and scales
Week 5	Lecture 9	Aerial Photography and Photogrammetry
	Lab 9	Stereoscopy lab
	Lecture 10	Modern Ortho imaging
	Lab 10	Lab with PhotoScan
Week 6	Lecture 11	Revision/Discussion
	Lab 11	Mid term exam
	Lecture 12	GIS concepts (raster, vector, database)
	Lab 12	FNSB GIS
Week 7	Lecture 13	GIS Analysis
	Lab 13	GIS Analysis (eg. making an FCC and NDVI)
	Lecture 14	DEM
	Lab 14	ArcGIS to compute SRM, Slope, Aspect, HillShade
Week 8	Lecture 15	Lidar
	Lab 15	Global Mapper: Visualize point-clouds for Fairbanks
	Lecture 16	SAR
	Lab 16	MapReady
Week 9	Lecture 17	Field data collection
	Lab 17	Map GPS points on a map
	Lecture 18	Cartography
	Lab 18	Add WMS base to earlier map
Week 10	Lecture 19	Spectral Signatures
	Lab 19	Use hypercube to play with RGB
	Lecture 20	Landcover Mapping
	Lab 20	Use hypercube to classify Fairbanks (clustering)
Week 11	Lecture 21	Change Detection
	Lab 21	Use Arc GIS for change detection (Amazon)
	Lecture 22	Applications of Change detection

	Lab 22	Several examples (coastal; urban; thermal; wetland)
Week 12	Lecture 23	Thanksgiving
	Lab 23	Thanksgiving
	Lecture 24	Thanksgiving
	Lab 24	Thanksgiving
Week 13	Lecture 25	Cadastral Applications
	Lab 25	Cadastral Lab with Arc GIS
	Lecture 26	Public Safety; Emergency Management
	Lab 26	Vehicle routing lab
Week 14	Lecture 27	Flooding / Landslides
	Lab 27	Inundation Analysis (H&H modeling)
	Lecture 28	Final Exams
	Lab 28	Final Exams