



**UNIVERSIDAD SAN FRANCISCO DE QUITO**  
**SCHOOL: CIENCIAS BIOLÓGICAS Y AMBIENTALES**  
**COURSE: REC 0317 – FIELD GEOGRAPHIC INFORMATION SYSTEMS**  
**Semester: 201910 – First Term 2019/2020 - NRC: XXXX**  
**Schedule: MTWTF 09:00 - 11:50 Room: GIS Lab - GEOcentro**

**LECTURER INFORMATION:**

**Name:** Leo Zurita Arthos, Ph.D.  
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**Office:** M318  
**Office hours:** Mondays and Thursdays, from 2-5 pm.

**COURSE INFORMATION:**

**Credits:** 4  
**Prerequisites:** ---

**COURSE DESCRIPTION:**

This course starts as a general introduction to the basics of Geographic Information Systems and Science and concentrates on applied field GIS techniques. It covers all the basic theoretical knowledge and the major developments along the history of Geo-information and it provides hands-on experience with Geo-technologies, to ultimately achieve solid basic skills on the use of a Desktop GIS software. Hence, it is a theoretical and practical course, where students will learn both the basics and applications of GIS with focus on field activities in the Galapagos urban and natural environments.

**SPECIFIC COURSE LEARNING OUTCOMES:**

Number	Learning Outcome	Level
1	Start to think spatially	Basic
2	Understand the importance of a GIS methodology to handle spatial data	Basic
3	Define the components of a typical GIS, and Differentiate among different types of spatial data	Intermediate
4	Gain understanding and experience in the use of Global Positioning Systems	Intermediate
5	Infer a general vision of the role of GIS in local and global societies	Advanced



## COURSE CONTENT:

- ✓ Thinking spatially is especially important
- ✓ What is GIS, its origins, components and capabilities
- ✓ Understanding spatial data and creating information ( $\rho$ )
- ✓ GPS basics and hands-on experience in the field and the lab ( $f$ )
- ✓ Vector and Raster Data formats ( $\rho$ )
- ✓ Geoprocessing tools and techniques ( $\rho$ )
- ✓ Acquiring spatial data for an ecological quick survey ( $f$ )
- ✓ Exploring collected data in the map ( $\rho$ )
- ✓ Georeferencing, Geocoding ( $\rho$ )
- ✓ Coordinate Systems and Projections
- ✓ Spatial analysis applied in a group project ( $\rho$ )
- ✓ Delivering a research and analysis result applying GIS

( $\rho$ ) = includes a practical session

( $f$ ) = includes fieldwork

## METHODOLOGY OF INTEGRATION FOR THEORETICAL AND PRACTICAL CONTENT:

The methodologies used to teach USFQ courses, by following the philosophy of Liberal Arts, foster dialogue and facilitate the construction of knowledge through the continuous exchange of ideas and experiences between professors and students. It is expected that in all courses the theoretical concepts will be linked to the professional practice and work contexts where students will perform in the future, with the intent to integrate activities and simulations of a diverse nature that promote the understanding of practical and realistic contexts.

There are **three short field trips** as part of this class: *i*) **Land track in semi-urban environment**: we will complete a Geocaching activity, while sampling the terrain in a track along the Chaquiñan trail, starting in Cumbaya and finishing in Puenbo. This trip will take a full day of work; *ii*) **Terrain survey in forest**: we are going to visit Mindo starting from the highlands in Yanacocha paramo forest, following down the Andes to Bellavista cloud forest, and finishing at Mindo cloud forest. Our objective is to survey the terrain at the local level through GPS quadrats, and follow the gradient down the regional scale through GPS tracks; and *iii*) **Highlands track**: we will visit the Teleferiqo, going from 2800 to 4100 meters above sea level in 20 mins through this cable car. We will do a GPS track and some land observations and measurements in the highland paramo of the Pichincha volcano. Further details of both fieldtrips will be discussed during the first day of class and prior to the field trip.



## COURSE GRADING:

The following scheme explains the categories for grading and their respective weight into the final grade

Category	Quantity	Percentage of final grade
Attendance to class, participation and engagement in field activities	11 days of class (6%) 3 field trips (2% each)	12%
GIS paper discussion	1 per student	7%
Short practical reports	5 in total (4 reports 6% each 1 detailed report 9%)	33%
Exam	1	18%
Map reports from fieldwork	3 (5% each)	15%
Final project		
- Written report	1	10%
- Oral presentation	1	5%
	<b>Total</b>	<b>100%</b>

## GRADING SCALE

Percentage	Grade	Quality	GPA Points
91-100%	A	Excellent	4
81-90%	B	Good	3
71-80%	C	Average	2
61-70%	D	Deficient	1
-60%	F	Failed	0

## Coursework description

The **discussion of GIS-related papers** is a written essay presented by the students. Each student should choose a paper related to Geo-technologies and its applications per their own interest, using the provided pool of publications provided in the platform. If a different paper is of the interest of a student, and they want to work on it, then it must be sent and approved by the lecturer. Further instructions are found in the activity description in the learning platform.

The **short practical reports** are directed activities where each student utilizes and applies different techniques learned and discussed in class in a specific practical



research problem, where the spatial variables are of relevance. Detailed instructions will be provided, and each student will have to produce a written short report.

There is an **exam**, composed of both theoretical and practical content, based on the materials covered in class. Each student would be assigned specific questions and instructions to complete an analysis and delivered the required results using their acquired GIS skills.

A report in the form of a **map** is required for each of the three field trips as indicated by the lecturer. Students will work in groups and should collect their data, so that they can be mapped in a layout using basic GIS skills.

The **final project** comprises two parts to be completed by the students. The written report should be presented in the form of a **story map** that summarizes the methods and results of the required analysis. This is complemented by the **oral presentation** in front of the class.

#### RECOMMENDED BIBLIOGRAPHY:

The recommended textbook is highlighted, and other recommended books and publications are presented alphabetically. Additionally, a compilation of peer-reviewed papers will be provided by the lecturer during the second week of class.

Bolstad, P. (2015) GIS Fundamentals: A First Text on Geographic Information Systems. Fifth Edition. 770 pages

ESRI, Environmental Research Institute (2017) The ArcGIS Book. Online. Available at <http://learn.arcgis.com/en/arcgis-book/>

ESRI, Environmental Research Institute (2018) Lesson Gallery. Online. Available at <http://learn.arcgis.com/en/gallery/>

Gandhi, Ujaval (2018). Tutoriales y Consejos de QGIS. Online. Available at <https://www.qgistutorials.com/en/>

Law, Michael. Collins, Amy (2016). Getting to Know ArcGIS Desktop. 5<sup>th</sup> ed., ESRI Press. Redlands. ISBN-13: 978-1589485105. ISBN-10: 1589485106. Amazon Kindle version <http://a.co/6bxz89m>

Law, Michael. Collins, Amy (2016). Getting to Know ArcGIS Pro. ESRI Press. Redlands. ISBN-13: 978-1589484573. ISBN-10: 1589484576.

Longley, P.A. Goodchild, M.F., Maguire, D.J. and Rhind, D.W. (2005) Geographic Information Systems and Science. John Wiley and Sons, Chichester. Second edition.

R Spatial (2018) Spatial Data Analysis and Modeling with R. Online. Available at <http://www.rspatial.org/>

#### COURSE POLICIES:

- All students must read, understand and follow the [Student Handbook](#)



- Our class takes place in a computer laboratory, so the rules of usage explained during the first day of class must be followed at all times.
- Use of cellphones and mobile devices should be directed by the lecturer for the learning purposes of the class. All personal texts and calls are not allowed during class.
- Late submissions need to be justified and then will be accepted with a 25% deduction per day of lateness.

#### TIMETABLE:

A detailed **time table** for each day of class is presented in the following pages and it is also available for syncing with your calendar through the following URL

[webcal://p09-calendarws.icloud.com/ca/subscribe/1/ovLRxT5LyHe5sJc4lhXbNhbh9cRgofyfRDBYvUfpvaSsGjPO4kde4O3XIES-K-O](https://p09-calendarws.icloud.com/ca/subscribe/1/ovLRxT5LyHe5sJc4lhXbNhbh9cRgofyfRDBYvUfpvaSsGjPO4kde4O3XIES-K-O)

This syllabus was reviewed and approved by the academic coordinator of the major/department, such that all sections should follow this syllabus. If it is necessary to make changes or adjustments to the syllabus, please ask the academic coordinator so that the approved changes/adjustments are reflected in the Curriculum Design system.

# January 13 to January 19, 2020

Week 3

January 2020							February 2020						
M	T	W	T	F	S	S	M	T	W	T	F	S	S
		1	2	3	4	5						1	2
6	7	8	9	10	11	12	3	4	5	6	7	8	9
<b>13</b>	<b>14</b>	<b>15</b>	<b>16</b>	<b>17</b>	<b>18</b>	<b>19</b>	10	11	12	13	14	15	16
20	21	22	23	24	25	26	17	18	19	20	21	22	23
27	28	29	30	31			24	25	26	27	28	29	

GIS GAIAS

	13 Monday	14 Tuesday	15 Wednesday	16 Thursday	17 Friday	18 Saturday	19 Sunday
8 AM							
9 AM							
10 AM	GIS GAIAS Syllabus review, Introduction to GIS, Spatial Thinking, Cotopaxi Practical, Ch. 1-2	GIS GAIAS Interacting with maps and data, Ch. 3-4	GIS GAIAS Map Layouts, Making Maps for Presentation, Projections and Coordinate System Ch. 6, exercises 6a-6d, Ch. 10, exc.	GIS GAIAS GPS data collection and mapping	Land track in semi-urban environment Geocaching activity, while sampling the terrain in a track along the Chaquiñan trail, starting in Cumbaya and finishing in Puenbo.		
11 AM			Vector and Raster Data Models	Creating and Editing Data, Ch. 11, Ch 12			
Noon							
1 PM							
2 PM							
3 PM	Animal Movement Framework (Alex Hearn) Room 2		Making maps (Marine Techniques Group)				
4 PM							
5 PM	Spatial Awareness (Marine Techniques Group)						
6 PM				choosing GIS Paper			
7 PM				Assignment 1 due			
8 PM				Assignment 2 due			

# January 20 to January 26, 2020

Week 4

January 2020							February 2020						
M	T	W	T	F	S	S	M	T	W	T	F	S	S
		1	2	3	4	5						1	2
6	7	8	9	10	11	12	3	4	5	6	7	8	9
13	14	15	16	17	18	19	10	11	12	13	14	15	16
<b>20</b>	<b>21</b>	<b>22</b>	<b>23</b>	<b>24</b>	<b>25</b>	<b>26</b>	17	18	19	20	21	22	23
27	28	29	30	31	24	25	26	27	28	29			

GIS GAIAS

	20 Monday	21 Tuesday	22 Wednesday	23 Thursday	24 Friday	25 Saturday	26 Sunday
8 AM					...Terrain survey in forest starting from the highlands in Yanacocha paramo forest, following down the Andes to Bellavista cloud forest, and finishing at Mindo cloud forest. Surveying the terrain at the local level through GPS quadrats, and follow the gradient down the regional scale through GPS tracks		
9 AM				Terrain survey in forest starting from the highlands in Yanacocha paramo forest, following down the Andes to Bellavista cloud forest, and finishing at Mindo cloud forest. Surveying the terrain at the local level through GPS quadrats, and follow the gradient down the regional scale through GPS tracks			
10 AM	GIS GAIAS Shark Tracking Data, Interpolation, Bathymetry, Field trip data download	GIS GAIAS Editing values and attributes, Ch. 13	GIS GAIAS Geoprocessing Tools in ArcGIS, Ch. 19				
11 AM		GIS GAIAS Georeferencing					
Noon							
1 PM							
2 PM							
3 PM	Satellite Tracking Technology (Alex Hearn) Room 2						
4 PM							
5 PM			GIS Paper Assignment due				
6 PM			Assignment 3 Shark				
7 PM			Assignment 4 Solar				
8 PM							

# January 27 to February 2, 2020

Week 5

January 2020							February 2020						
M	T	W	T	F	S	S	M	T	W	T	F	S	S
		1	2	3	4	5						1	2
6	7	8	9	10	11	12	3	4	5	6	7	8	9
13	14	15	16	17	18	19	10	11	12	13	14	15	16
20	21	22	23	24	25	26	17	18	19	20	21	22	23
27	28	29	30	31			24	25	26	27	28	29	

GIS GAIAS

	27 Monday	28 Tuesday	29 Wednesday	30 Thursday	31 Friday	1 Saturday	2 Sunday
7 AM							
8 AM				Highlands track Teleferiqo, going from 2800 to 4100 meters above sea level in 20 mins through this cable car. GPS track and some land ob- servations in the highland paramo of the Pichincha volcano			
9 AM							
10 AM	GIS GAIAS Practical exercise applying GIS techniques	GIS GAIAS Analyzing geospatial data, Ch. 20	GIS GAIAS Final Project workshop 2		GIS GAIAS Final Project Presentation. Wrap up for class and preparation for Galapagos		
11 AM							
Noon							
1 PM							
2 PM							
3 PM							
4 PM							
5 PM							
6 PM		Assignment 5 due	Fieldwork Assigment due		Final project due		
7 PM							