LSU | **College of Art + Design**

LA 4201 & 7075 | **GIS for Designers**

Brendan Harmon
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Fall 2019. Design 301.
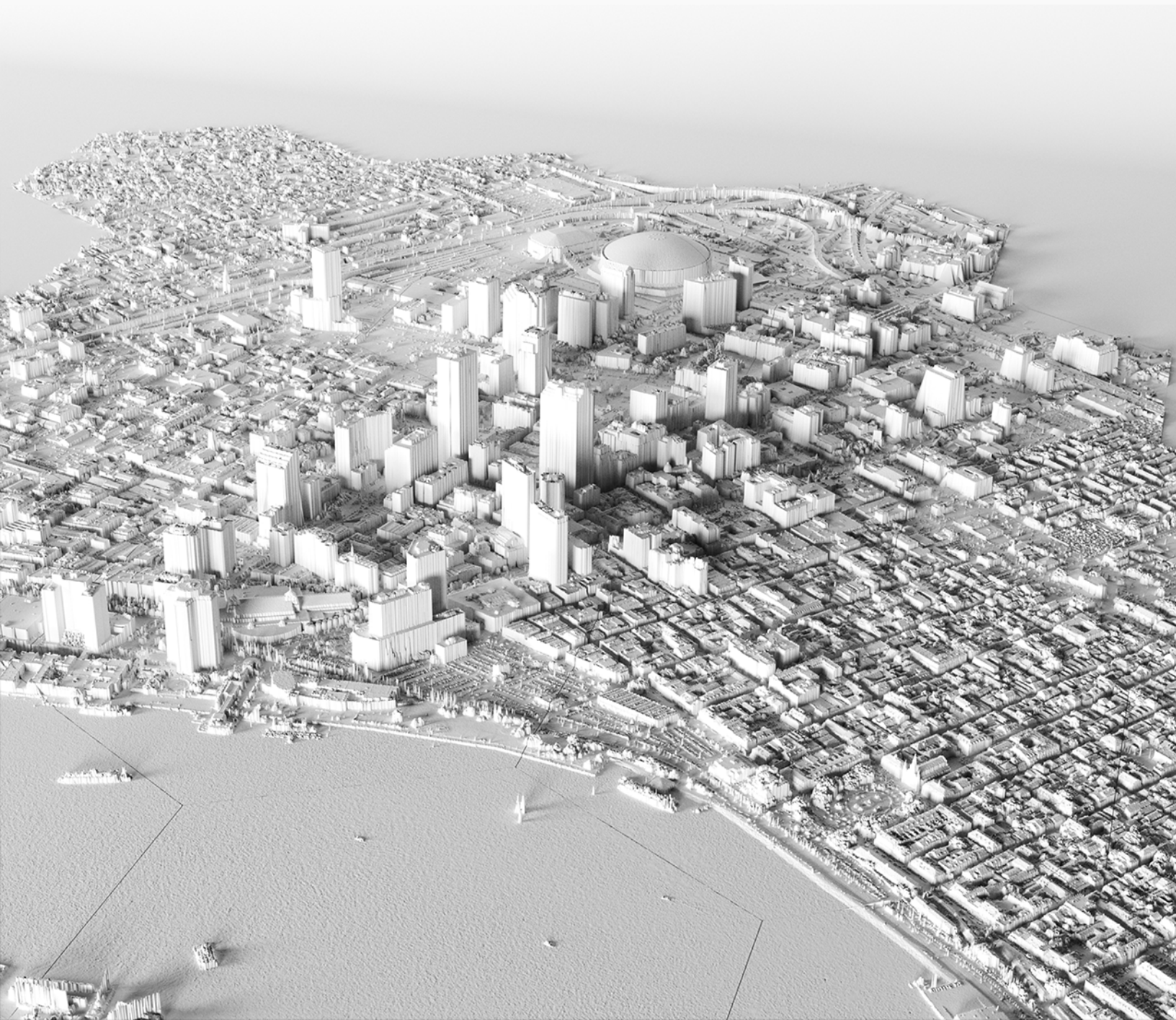Monday, Wednesday, & Friday 9:30am–11:30pm.

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Course Description

This course is an introduction to Geographic Information Systems (GIS) and Science (GISc) for designers. Learn about the history, theory, methods, and applications of GIS. Acquire, map, model, and analyze spatial and temporal data. Make beautiful maps and digitally fabricated models from spatiotemporal data

Topics

1	Design with Nature	6	Remote sensing	11	Topography
2	Intro to GIS	7	Digital fabrication	12	Hydrology
3	Global maps	8	Solar & Visibility	13	Map algebra
4	Statewide maps	9	Census data	14	Suitability
5	City maps	10	Historical maps	15	Map exhibition

Projects

Map spatial and temporal data at global, national, state, and city scales. Make beautiful maps that clearly, legibly represent the data, express your message, and follow cartographic conventions. Legends, scale bars, and north arrows are required. Upload your working files and finished work to the course drive. Exhibit your collected work at the end of the semester on *12/2/2019*.

Global maps Create a map of a global pattern or process. Possible topics include landcover change, protected areas, urbanization, biodiversity, hydrology, transportation, etc. Choose your map projection carefully. Cartographic grids or graticules are recommended. *Draft due: 9/16/2019*

National & state maps Create a map of the U.S.A. or Louisiana. Possible topics include coastal change, urbanization, hydrology, topography, fire, biodiversity, protected areas, transportation, infrastructure, levees, oil and gas, etc. *Draft due: 9/23/2019*

City maps Create a map of New Orleans. Possible topics include the built environment, cultural events, cultural and historic places, socioeconomic conditions, public health, crime, education, hydrology, terrain, levees, flooding, etc. *Draft due: 9/23/2019*

Suitability map Use map overlay analysis to develop a suitability map. Create a diagram illustrating the logic of your analysis. *Draft due: 11/25/2019*

3D printed city 3D print the city of New Orleans from lidar data. As a class use a tiling scheme to divide the lidar data into smaller tiles for printing. Each of you will 3D print a tile and then as a class you will put your tiles together to build a complete model of downtown New Orleans. Each of you will project a map onto the model. *Draft due: 10/28/2019*

Portfolio Collect your work in a course portfolio for the school's accreditation archive. *Due: 12/13/2019*

Software

QGIS | https://qgis.org/
GRASS GIS | https://grass.osgeo.org/
ArcGIS | https://www.esri.com/

Rhinoceros | https://www.rhino3d.com/
RhinoTerrain |
http://www.rhinoterrain.com/

Resources

Intro to GRASS GIS | https://ncsu-geoforall-lab.github.io/grass-intro-workshop/
GRASS GIS tutorials | https://grass.osgeo.org/documentation/tutorials/
QGIS training material | https://www.qgis.org/en/site/forusers/trainingmaterial/
ArcGIS training | https://www.esri.com/training/
Learn ArcGIS | https://learn.arcgis.com/
Geospatial data sources | http://bit.ly/geodatasource
ArcGIS Online | https://arcg.is/1eLuHC + https://arcg.is/1zTvrn
Global Dataset | https://doi.org/10.5281/zenodo.3359632
Louisiana Dataset | https://doi.org/10.5281/zenodo.3359620
New Orleans Dataset | https://doi.org/10.5281/zenodo.3359642

Graduate Certificate in GIS

This course counts as an applied topics course for the Graduate Certificate in Geographic Information Science. The Graduate Certificate in Geographic Information Science at LSU is a 12 credit hour standalone certificate with courses offered in the Department of Geography and Anthropology, College of Art and Design, Department of Economics, School of the Coast and Environment, Department of Civil and Environmental Engineering, and Department of Computer Science. For more information about the Graduate Certificate in GIS visit: http://ga.lsu.edu/gis-certificate/.

Grading

Global maps	20%	Suitability maps	20%
National & state maps	20%	3D printed city	15%
City maps	20%	Portfolio	5%

Terminology

Cartography

· Datum

· Geographic coordinate system

· Map projection

· Cartographic grid

· Graticule

Spatial data

· Raster & vector

· Array

· Point & point cloud

· Mesh

· Triangulated irregular network (TIN)

· Discrete & continuous data

· Plain text

· Comma separated values (CSV)

· Integer & floating point numbers

Geospatial

· Geographic information system (GIS)

· Digital terrain model (DTM)

· Digital surface model (DSM)

· Digital elevation model (DEM)

· Depressionless DEM

· Lidar

· Delaunay triangulation

· Bilinear interpolation

· Nearest neighbors

· Map algebra

· Null value

· Resampling

· True color imagery

· Image classification

· Normalized difference vegetation index (NDVI)

Geography

· Hypsometric tints

· Contour

· Hillshade

· Slope

· Aspect

· Watershed

· Single flow direction (SFD/D8)

· Multiple flow direction (MFD)

· Flow accumulation

· Stream order

Readings

Correa, Felipe. 2018. *São Paulo: A Graphic Biography*. University of Texas Press.

Busquets, J, and P Pérez-Ramos. 2017. *Barcelona: Manifold Grids and the Cerdà Plan*. Redesigning Gridded Cities. Applied Research / Design Publishing.

Cheshire, James, and Oliver Uberti. 2017. *Where the Animals Go: Tracking Wildlife with Technology in 50 Maps and Graphics*. W. W. Norton.

Desimini, Jill, Charles Waldheim, and Mohsen Mostafavi. 2016. *Cartographic Grounds: Projecting the Landscape Imaginary*. Princeton Architectural Press.

San-Miguel-Ayanz, J, D de Rigo, G Caudullo, T H Durrant, A Mauri, European Commission. Joint Research Centre, and Europäische Union. 2016. *European Atlas of Forest Tree Species*. Publications Office of the European Union.

Acciavatti, Anthony. 2015. *Ganges Water Machine: Designing New India's Ancient River*. ORO Editions.

Antoniou, A, R Klanten, S Ehmann, and A A Kotmair. 2015. *Mind the Map: Illustrated Maps and Cartography*. Gestalten.

White, G, M Pienaar, and B Serfontein. 2015. *Africa Drawn: One Hundred Cities*. DOM Publishers.

Cheshire, J, and O Uberti. 2014. *London: The Information Capital: 100 Maps and Graphics that Will Change how You View the City*. Penguin Books, Limited.

Correa, Felipe, and Carlos Garciavelez Alfaro. 2014. *Mexico City: Between Geometry and Geography*. Hong Kong: Applied Research / Design Publishing.

Neteler, Markus, and Helena Mitasova. 2013. *Open source GIS: a GRASS GIS approach*. Vol. 689. Springer Science & Business Media.

Solnit, R, and R Snedeker. 2013. *Unfathomable City: A New Orleans Atlas*. University of California Press.

Steinitz, Carl. 2012. *A Framework for Geodesign: Changing Geography by Design*. Redlands, California: Esri Press.

Forman, Richard T T. 2008. *Urban Regions: Ecology and Planning Beyond the City*. Cambridge University Press.

Steinitz, C, H Arias, S Bassett, M Flaxman, T Goode, T Maddock, D Mouat, R Peiser, and A Shearer. 2003. *Alternative Futures for Changing Landscapes: The Upper San Pedro River Basin In Arizona And Sonora*. Island Press.

Hulse, D, S Gregory, J P Baker, and Pacific Northwest Ecosystem Research Consortium. 2002. *Willamette River Basin Planning Atlas: Trajectories of Environmental and Ecological Change*. Oregon State University Press.

Tufte, Edward R. 1997. *Visual Explanations: Images and Quantities, Evidence and Narrative*. Graphics Press.

McHarg, Ian. 1995. *Design with Nature*. Wiley Series in Sustainable Design. Wiley.

Tufte, Edward R. 1983. *The Visual Display of Quantitative Information*. Graphics Press.

Policies

Accreditation Expectations As an accredited Landscape Architecture program LSU's Robert Reich School of Landscape Architecture (RRSLA) must meet the accreditation requirements as stated by the Landscape Architectural Accreditation Board (LAAB) to ensure RRSLA is meeting the expectations of the field. The LAAB requires programs to provide digital copies of student work as part of this process. Students in this course will be expected to comply with the following requirements as 5% of their course grade: (1) Students must provide a course portfolio with work samples specified by the instructor before the end of the grading period. (2) Each student's course portfolio must be saved as a single, high resolution PDF file with multiple pages. (3) Files must follow the naming convention established by the school: department-coursenumber-semesteryear-username.pdf. Example: LA4201-F2019-baharmon.pdf.

Time Commitment Expectations LSU's general policy states that for each credit hour, you (the student) should plan to spend at least two hours working on course related activities outside of class. Since this course is for three credit hours, you should expect to spend a minimum of six hours outside of class each week working on assignments for this course. For more information see: `http://catalog.lsu.edu/content.php?catoid=12&navoid=822`.

LSU student code of conduct The LSU student code of conduct explains student rights, excused absences, and what is expected of student behavior. Students are expected to understand this code: `http://students.lsu.edu/saa/students/code`.

Disability Code The University is committed to making reasonable efforts to assist individuals with disabilities in their efforts to avail themselves of services and programs offered by the University. To this end, Louisiana State University will provide reasonable accommodations for persons with documented qualifying dis-

abilities. If you have a disability and feel you need accommodations in this course, you must present a letter to me from Disability Services in 115 Johnston Hall, indicating the existence of a disability and the suggested accommodations.

Academic Integrity According to section 10.1 of the LSU Code of Student Conduct, "A student may be charged with Academic Misconduct" for a variety of offenses, including the following: unauthorized copying, collusion, or collaboration; "falsifying" data or citations; "assisting someone in the commission or attempted commission of an offense"; and plagiarism, which is defined in section 10.1.H as a "lack of appropriate citation, or the unacknowledged inclusion of someone else's words, structure, ideas, or data; failure to identify a source, or the submission of essentially the same work for two assignments without permission of the instructor(s)."

Plagiarism and Citation Method Plagiarism is the "lack of appropriate citation, or the unacknowledged inclusion of someone else's words, structure, ideas, or data; failure to identify a source, or the submission of essentially the same work for two assignments without permission of the instructor(s)" (Sec. 10.1.H of the LSU Code of Student Conduct). As a student at LSU, it is your responsibility to refrain from plagiarizing the academic property of another and to utilize appropriate citation method for all coursework. In this class, it is recommended that you use Chicago Style author-date citations. Ignorance of the citation method is not an excuse for academic misconduct.