USC Dornsife
Dana and David Dornsife
College of Letters, Arts and Sciences
*Spatial Sciences Institute*

# SSCI 576, Remote Sensing Applications and Emerging Technologies

*Syllabus*

**Units:** 4

**Term — Day — Time:** Fall, 2021;
Online; Zoom links available on course Blackboard

**Instructor:** Andrew J. Marx, Ph.D
**Office:** Remote
**Office Hours:** Monday and Wednesday 11 am-noon PT via Zoom – please contact me in advance to ensure I will be online. Also available most days and times by appointment via email.
**Contact Info:** marxa@usc.edu,

**Library Help:** Andy Rutkowski
**Office:** VKC 36B
**Office Hours:** Tue 10 am-12 pm and Thu 4:30-5:30 pm PT
**Contact Info:** arutkows@usc.edu, 213-740-6390
http://bit.ly/andyhangout

**IT Help:** Richard Tsung
**Office:** AHF 145D
**Office Hours:** By appointment
**Contact Info:** spatial_support@usc.edu, 213-821-4415

## Course Scope and Purpose

This course is a required course for the Spatial Data Collection and Integration Graduate Certificate and an elective course for the Geographic Information Science & Technology (GIST), Geospatial Intelligence, and Geospatial Leadership Graduate Certificates as well as the GIST M.S. degree programs. This course explores some of the ways in which remote sensing systems provide geospatial information that is relevant, accurate, timely, accessible, available in an appropriate format and cost-effective. Recent developments in Earth observation such as imaging radar, LiDAR, hyperspectral sensors, SmallSats and unoccupied autonomous systems (UASs) are increasing the wealth of information that can be generated from remotely sensed data sources. Consequently, numerous new GIS applications that rely on advanced remotely sensed data sources have emerged at local, regional and global scales.

This a graduate level course, so you should expect this class to be both academically robust and intellectually challenging. As graduate students you are expected to engage with the information you are learning and to explore the heady cauldron of ideas, opinion, and analysis that describe our collective effort to thoroughly interrogate the subject at hand. Learning arises from active engagement with the knowledge found in our reading materials and with one another. As in any graduate-level class, the instructor's role is that of a guide who keeps you on this path of discovery and you will find that you will learn much from your fellow classmates. The challenge for us is to replicate such an academic experience within the milieu of "online learning".

All course materials will be organized through Blackboard. The main theoretical concepts will be provided through course notes and assigned readings. Hands-on practical exercises will use various software products accessible over the Internet. Assignments will give students an opportunity to internalize and apply the concepts and theory learned from readings. Some assignments require student interaction, all will benefit from it.

### *Learning Objectives*

When you have completed this course, you will be able to:

- Explain the principles of remote sensing and the technical characteristics and constraints of Earth Observation missions.
- Generate geographical information by processing digital remotely sensed data and critically evaluate its use for human security and/or environmental applications.
- Specify and critically evaluate some of the opportunities and available methods for integrating remote sensing and GIS.

Students may vary in their competency levels on these abilities. You can expect to acquire these abilities only if you honor all course policies, attend classes regularly, complete all assigned work in good faith and on time, and meet all other course expectations of you as a student.

**Prerequisite(s):** None
**Co-requisite(s):** None

**Concurrent Enrollment:** None
**Recommended Preparation:** SSCI 581: *Concepts for Spatial Thinking*

## Class Conduct

**Harassment, sexual misconduct, interpersonal violence, and stalking** are not tolerated by the university. All faculty and most staff are considered Responsible Employees by the university and must forward all information they receive about these types of situations to the Title IX Coordinator. The Title IX Coordinator is responsible for assisting students with supportive accommodations, including academic accommodations, as well as investigating these incidents if the reporting student wants an investigation. The Title IX office is also responsible for coordinating supportive measures for transgender and nonbinary students such as faculty notifications, and more. If you need supportive accommodations, you may contact the Title IX Coordinator directly (titleix@usc.edu or 213-821-8298) without sharing any personal information with me. If you would like to speak with a confidential counselor, Relationship and Sexual Violence Prevention Services (RSVP) provides 24/7 confidential support for students (213-740-9355 (WELL); press 0 after hours)

## Course Structure

As a graduate level course, you should expect this class to be both academically robust and intellectually and technically challenging. As a graduate student, you are expected to engage with the information and workflows you are learning as well as with one another. As in any graduate level class, the instructor's role is that of a guide who keeps you on path of discovery and you will find that you will learn much from your fellow classmates.

All course materials will be organized through Blackboard and will generally unfold on a weekly basis, with the week's material posted at the start of the week. The main theoretical concepts will be provided through course notes and assigned readings, and at times recorded video presentations. Hands-on practical exercises will use various software products accessible over the Internet. Assignments will give you an opportunity to internalize and apply the concepts and theory learned from readings. Some assignments require student interaction; all will benefit from it.

*Workload* – This is a four credit, one semester graduate level course. Students should expect to spend 10-15 hours per week to complete the work in this class.

## Technological and Communication Requirements

We have several technologies that will facilitate our course work and our interactions, despite our dispersed locations. The remote sensing software and data required for course assignments will be accessed using computing resources provided by the Spatial Sciences Institute. ArcGIS and Drone 2 Map are provided online via the SSI Server; hence, you do not need to install it on your own computer. At their home workspaces, every student must have the following technology requirements:

- A computer with a fast Internet connection.

- A functional webcam and a microphone for use whenever a presentation or meeting is scheduled.
- An up-to date web browser to access the SSI server.

If a student does not have access to any of these, please speak with the instructors at the start of the semester. And see the USC ITS Student Toolkit here: https://keepteaching.usc.edu/students/student-toolkit/

*Blackboard* – All course materials and correspondence will be posted on the course Blackboard site. As a registered student, you will find this course will show up in your available classes no later than 12:00 noon, PST on the first day of classes. It is here that the day-to-day flow of the course will be recorded.

*Discussion boards* – On the Blackboard site, we will post a number of discussion threads related to various course topics. These threads are very important in terms of providing support to each other while working on class exercises to share hints and helpful tips, as you would do in a classroom setting. I will check the discussion threads periodically and offer occasional comments. Please send your course instructor an email directly if you have a question or concern that requires my immediate attention.

*Live meetings and presentations* – We will use Zoom to create synchronous, interactive sessions. With voice and webcam capabilities, Zoom can be used to share presentations and even our desktops between two or more people.

*Individual meetings* – We generally use Zoom for individual meetings.

*SSI server and tech support* – This course will utilize the SSI Servers to provide you with your own virtual desktop. If you are unable to connect to the server or experience any type of technical issues, send an email to SSI Tech Support at spatial_support@usc.edu and make sure to copy (cc) me on the email. SSI Tech Support is available Monday through Friday, 9:00 a.m.to 5:00 p.m. PST. A variety of geospatial software platforms (ArcGIS, e-Cognition, Idrisi, etc.) are provided online via the SSI Server; hence, you do not need to install it on your own computer.

*Technical Requirements* - Every student must satisfy the following technology requirements: (1) a computer with a fast Internet connection; (2) a functional webcam and a microphone for use whenever a presentation or meeting is scheduled; and (3) a modern web browser.

## Required Readings and Supplementary Materials

Textbooks – There are two required texts for this course. The first and second books by Esri Press can be purchased from online outlets such as Amazon, accessed via VitalSource.com or purchased from the USC Bookstore. The third book by Campbell is optional but recommended for those who have not taken SSCI 588 or a previous remote sensing course. It can be purchased from the USC Bookstore or online outlets such as Amazon.

- Green, K., Congalton, R.G., and Tukman, M., 2017. *Imagery and GIS – Best Practices for Extracting Information from Imagery.* Redlands, California, Esri Press. (Required)
- Keranen, K, and Kolvoord, R., 2017. *Making Spatial Decisions Using ArcGIS Pro: A Workbook.* Redlands, 1st edition. Redlands, California, Esri Press. (Required)
- Campbell, J.B., 2011. *Introduction to Remote Sensing,* 5th edition. New York, Guilford Press. (Optional)

These textbooks will be supplemented with Course Notes and a mixture of readings from academic journals, professional reports and authoritative websites.

Supplemental Readings **–** The following book chapters and journal articles will be posted to Blackboard under Course Documents (additional articles may be added as the semester progresses):

- Belgiu, M. and Csillik, O., 2018. Sentinel-2 cropland mapping using pixel-based and object-based time-weighted dynamic time warping analysis. *Remote Sensing of Environment,* 204, 509-523.
- Blaschke, T., Hay, G.J., Kelly, M., Lang, S., Hofmann, P., Addink, E., … Tiede, D., 2014. Geographic Object-Based Image Analysis: Towards a new paradigm. *ISPRS Journal of Photogrammetry and Remote Sensing,* 87, 180-191.
- Benkelman, C., 2015. Ingesting, Managing, and Using UAV (Drone) Imagery in the ArcGIS Platform, Version 2. Esri draft document.
- Boyd, D.S. and Danson, F.M., 2005. Satellite remote sensing of forest resources: Three decades of research development. *Progress in Physical Geography* 29: 1-26.
- Burnett, C. and Blaschke, T., 2003. A multi-scale segmentation/object relationship modeling methodology for landscape analysis. *Ecological Modelling* 168: 233-249.
- Carter, J., Schmid, K., Waters, K., Betzhold, L., Hadley, B., Mataosky, R. and Halleran, J., 2012. Lidar 101: An Introduction to Lidar Technology, Data, and Applications. National Oceanic and Atmospheric Administration (NOAA) Coastal Services Center, Charleston, South Carolina. *Charleston, SC*.
- Clark, R.N., 1999. Spectroscopy of rocks and minerals, and principles of spectroscopy. *Manual of remote sensing*, *3*(3-58), pp.2-2.
- Claverie, M., Ju, J., Masek, J. G., Dungan, J. L., Vermote, E. F., Roger, J.-C., Skakun, S. V., and Justice, C., 2018. The harmonized Landsat and Sentinel-2 surface reflectance data set. *Remote Sensing of Environment,* 219, 145-161.
- Colomina, I. and Molina, P., 2014. Unmanned aerial systems for photogrammetry and remote sensing: A review. *ISPRS Journal of photogrammetry and remote sensing*, *92*, pp.79-97.

- Deilami, K., Kamruzzaman, Md., and Liu, Y., 2018. Urban heat island effect: A systematic review of spatio-temporal factors, data, methods, and mitigation measures. *International Journal of Applied Earth Observation and Geoinformation,* 67, 30-42.
- Frantz, D., Haß, E., Uhl, A., Stoffels, J., and Hill, J., 2018. Improvement of the Fmask algorithm for Sentinel-2 images: Separating clouds from bright surfaces based on parallax effects. *Remote Sensing of Environment,* 215, 471-481.
- Gao, F. and Zhang, X., 2021. Mapping Crop Phenology in Near Real-Time Using Satellite Remote Sensing: Challenges and Opportunities. *Journal of Remote Sensing*, *2021*.
- Gilliespie, T.W., Chu, J., Frankenberg, E., and Thomas, D., 2007. Assessment and prediction of natural hazards from satellite imagery. *Progress in Physical Geography* 31: 459470.
- Hansen, Matthew C., and Thomas R. Loveland., 2012. A review of large area monitoring of land cover change using Landsat data. *Remote sensing of Environment* 122: 66-74.
- Huang, Huabing, Yanlei Chen, Nicholas Clinton, Jie Wang, Xiaoyi Wang, Caixia Liu, Peng Gong et al., 2017. Mapping major land cover dynamics in Beijing using all Landsat images in Google Earth Engine. *Remote Sensing of Environment* 202: 166-176.
- Kakaes, K.A., Greenwood, F., Lippincott, M., Dosemagen, S., Meier, P. and Wich, S., 2015. Drones and aerial observation: new technologies for property rights, human rights, and global development. A primer. *New America*, pp.6-103.
- Kang, J., Körner, M., Wang, Y.-Y., Taubenböck, H., and Zhu, X.X., 2018. Building instance classification using street view images. *ISPRS Journal of Photogrammetry and Remote Sensing,* 145(Part A), 44-59.
- Kanjir, U., Greidanus, H., and Oštirca, K., 2018. Vessel detection and classification from spaceborne optical images: A literature survey. *Remote Sensing of Environment,* 207, 1-26.
- Kokaly, R.F., Clark, R.N., Swayze, G.A., Livo, K.E., Hoefen, T.M., Pearson, N.C., Wise, R.A., Benzel, W.M., Lowers, H.A., Driscoll, R.L., and Klein, A.J., 2017. USGS Spectral Library Version 7: U.S. Geological Survey Data Series 1035, 61 p., https://doi.org/10.3133/ds1035.
- Kross, A., McNairn, H., Lapen, D., Sunohara, M., and Champagne, C., 2015. Assessment of RapidEye vegetation indices for estimation of leaf area index and biomass in corn and soybean crops. *International Journal of Applied Earth Observation and Geoinformation,* 34, 235-248.
- Kulbacki, M., Segen, J., Knieć, W., Klempous, R., Kluwak, K., Nikodem, J., Kulbacka, J. and Serester, A., 2018. Survey of drones for agriculture automation from planting to harvest. In *2018 IEEE 22nd International Conference on Intelligent Engineering Systems (INES)* (pp. 000353-000358). IEEE.

- Lewis, A., Oliver, S., Lymburner, L., Evans, B., Wyborn, L., Mueller, N. … Wang, L.-W., 2017. The Australian Geoscience Data Cube: Foundations and lessons learned. *Remote Sensing of Environment,* 202, 276-292.
- National Academies of Sciences, Engineering, and Medicine, 2019. *Thriving on our changing planet: A decadal strategy for Earth observation from space*. National Academies Press.
- Mishra, S., 2017. Unsupervised learning and data clustering. *URL: https://towardsdatascience. com/unsupervised-learning-and-data-clusteringeeecb78b422a*.
- Nguyen, Uyen NT, Lien TH Pham, and Thanh Duc Dang, 2019. "An automatic water detection approach using Landsat 8 OLI and Google Earth Engine cloud computing to map lakes and reservoirs in New Zealand." *Environmental monitoring and assessment* 191, no. 4: 1-12.
- Planet, 2018. Gaining energy insights from satellite imagery. URL: https://info.planet.com/ebook-data-driven-energy-insights-from-satellite-imagery/
- Rashed, T., Weeks, J.R., and Gadalla, M.S., 2001. Revealing the anatomy of cities through spectral mixture analysis of multispectral satellite imagery: A case study of the Greater Cairo region, Egypt. *Geocarto International* 16: 5-16.
- Reuter, R., 2012. SEOS-Earsel's project on science education through earth observation for high schools SEOS. *Ambiência*, *8*(4), pp.583-590.
- Rochon, Gilbert L., Joseph E. Quansah, Souleymane Fall, Bereket Araya, Larry L. Biehl, Thierno Thiam, Sohaib Ghani, Lova Rakotomalala, Hildred S. Rochon, Angel Torres Valcarcel, Bertin Hilaire Mbongo, Jinha Jung, Darion Grant, Wonkook Kim, Abdur Rahman M. Maud, and Chetan Maringanti., 2010. Remote Sensing, Public Health & Disaster Mitigation. *Geospatial Technologies in Environmental Management*, Geotechnologies and the Environment 3: 187-209.
- Sharifi, Ali., 1999. "Remote sensing and decision support systems." In *Spatial Statistics for Remote Sensing*, pp. 243-260. Springer, Dordrecht.
- Wang, R., Peethambaran, J., and Chen, D., 2018. LiDAR point clouds to 3-D urban models: A review. *IEEE Journal of Selected Topics in Applied Earth Observations and Remote Sensing,* 11(2), 606-627.


## Description and Assessment of Assignments

### *Weekly Assignments*

There are several different kinds of assignments with at least one due weekly. These are described in the Weekly Folders on Blackboard. Due dates are shown in the Schedule below.

*Resume Assignment – 1 worth 2 points.* We require all current students to post and maintain a public resume, short biography and recent photo on our shared GIST Student Community Blackboard site. With your permission, your photo and resume will be posted to the Spatial

Sciences Institute website and your resume will be included in the GIST Resume Book. The latter is compiled annually and along with our web presence used to promote our programs and more importantly, your skills, experience, and professional aspirations.

*Reading Assignments - 7 worth 3 points* – Each student is required to complete all reading assignments for this class. The reading assignments will focus on the theory portion of the course as presented in the weekly readings. The objective of the reading is to help you evaluate and integrate the information you have acquired from the course readings. Some of these will involve discussions and collaborative work and some will be individual efforts.

*Exercises - 9 worth 4 points* – These will be scheduled throughout the semester and will require you to work through various individual exercises during the weeks they are assigned. To demonstrate that you have completed all parts of the exercises, you will have specific deliverables which you will turn in as a digital output or brief text response.

***Research Reports***

Three assignments will provide students an opportunity to integrate learning from various aspects of the course through the practice of a more in-depth assignment.

*First Report – 1 worth 10 points* – The first report will provide you with an opportunity to describe the data capture options and challenges for a project of your choice from a variety of domains.

*Second Report – 1 worth 20 points* – The second report will build on the data capture part of the course by providing students an opportunity to integrate all that they have learned in the semester by executing a specific remote sensing chain of analysis with professional deliverable.

*Presentation - 1 worth 11 points* –This assignment will require some independent thought and synthesis and allow you to explore a case study of your choice. Results will be presented via Zoom in the week preceding the finals exam.

## Grading Breakdown

Careful planning and a serious, consistent commitment will be required for you to successfully navigate the various deliverables in this and other GIST courses. The table below summarizes the SSCI 576 course assignments and their point distribution:

| Assignments | Number | Points | Total Points |
|---|---|---|---|
| Weekly Assignments | | | |
| Exercises | 9 | 4 | 36 |
| Reading/Forum Assignments | 7 | 3 | 21 |
| Resume Assignment | 1 | 2 | 2 |

| Project Components | | | |
|---|---|---|---|
| First Research Report | 1 | 10 | 10 |
| Second Research Report | 1 | 20 | 20 |
| Presentation | 1 | 11 | 11 |
| **Totals** | **19** | **-** | **100** |

## Assignment Submission Policy

Assignments will be submitted for grading via Blackboard using the due dates specified in the Course Schedule below. It is important to note from the outset that: (1) you are expected to complete and upload all assignments before the deadlines detailed on Blackboard; (2) late postings and assignments will be docked one grade and no grade will be given for postings or assignments turned in more than one week late; and (3) no written work will be accepted for grading after 5:00 p.m. PT on the last day of classes. Any exceptions to these turn-in assignments are only made by me in coordination with individual students. An example of an exception would be a student's illness or injury that reasonably prohibits course involvement/participation.

## Additional Policies

This is a distance learning course, so most of our interactions will be asynchronous (not at the same time). All materials to be handed in will be submitted via the Blackboard Assessment link. I will also create multiple Blackboard discussion forums throughout the semester that we will use for the aforementioned assignments and so we can discuss issues and comments on the course assignments, exercises and projects as the need arises.

In addition, I will send via e-mail through Blackboard any notices that are time sensitive. Please be sure that you read as soon as possible all e-mail sent from Blackboard or from me. Check now to make sure that mail sent from both the USC blackboard accounts and my private domain does not go into your junk mail!

While I am usually online and will probably respond to e-mails from students relatively quickly, I will endeavor to respond to all e-mail within 24 hours of receipt, aiming for no more than 48 hours delay. In the rare case when I expect to be offline for more than 60 hours, I will post an announcement on the Blackboard site.

That said, it is each student's responsibility to stay informed about what is going on in our course. In addition to e-mail about time-sensitive topics, any important announcements will be posted on the Announcement page in Blackboard. Be sure to check these each time you log onto Blackboard.

## Course Schedule

| | Topic | Readings and Assignments | Deliverables |
|---|---|---|---|
| **Module 1: Principles of Remote Sensing** | | | |
| **Week 1**<br>8/23 | **Discovering Imagery, Part I:**<br>Introduction to Imagery and Thinking About the Possibilities. | Green 1, 2;<br>Reuter (2012) (optional);<br>Campbell 1, 2 (optional) | Resume Assignment |
| **Week 2**<br>8/30 | **Discovering Imagery, Part II:**<br>Imagery Fundamentals and Choosing and Accessing the Right Imagery | Green 3, 4 | Reading Assignment 1;<br>Exercise 1 |
| **Week 3**<br>9/7*, Monday, 9/6 is a university holiday | **Using Imagery:**<br>Working with Imagery and Imagery Processing | Green 5, 6 | Exercise 2 |
| **Module 2: Data to Decisions** | | | |
| **Week 4**<br>9/13 | **Extracting Information from Imagery, Part I:**<br>Importance of the Classification Scheme; Linking Variation in the Imagery to Variation on the Ground;<br>Unsupervised Classification | Green 7, 9, 10;<br>Mishra (2017) (optional) | Reading Assignment 2;<br>Exercise 3 |
| **Week 5**<br>9/20 | **Extracting Information from Imagery, Part II:**<br>Supervised Classification;<br>Accuracy Assessment;<br>Introduction to Esri Notebooks | Green 12;<br>Campbell 14 (optional) | Exercise 4;<br>Coding Exercise (optional) |
| **Week 6**<br>9/27 | **Extracting Information from Imagery, Part III:**<br>Object-Based Classification;<br>Change Detection | Green 11 | Reading Assignment 3;<br>Exercise 5 |
| **Module 3: Multidimensional Data** | | | |
| **Week 7**<br>10/4 | **LIDAR:**<br>Processing LIDAR Image Data;<br>Digital Elevation Models | Green 8;<br>Carter et. al (2012);<br>Campbell 8 (optional) | Exercise 6 |
| **Week 8**<br>10/11<br>*10/14-10/15 is a | **Hyperspectral and Advanced LIDAR:**<br>Spectral Libraries;<br>Slope and Aspect | Retuer (2012);<br>Campbell 15 | Reading Assignment 4;<br>Exercise 7 |

| | | | |
|---|---|---|---|
| university holiday | | | |
| **Week 9** 10/18 | **Point Clouds:** Unmanned Aerial Systems (drones); 3D Object Classification | Colomina and Molina (2014); Kakaes et. al (2015); Benkelman (2015) | Exercise 8 |
| **Week 10** 10/25 | **SpatioTemporal Data:** High-Cadence Earth Observatories (SmallSats); Time-Series and On-the-Fly Analysis | Reuter et. al (2012); Pasquarella et. al (2016); | Exercise 9; Reading Assignment 5 |
| **Module 4: Emerging Applications in Remote Sensing** | | | |
| **Week 11** 11/1 | **Applications – Part I:** Plant Sciences; Ecological Forecasting; Agriculture and Food Security | Kulbacki et. al (2018); Campbell 17 (optional) | Report 1 |
| **Week 12** 11/8 | **Applications – Part II:** Earth Sciences; Energy | Clark (1999); Campbell 18; Planet (2018) | Reading Assignment 6 |
| **Week 13** 11/15 | **Applications – Part III and IV:** Hydrospheric Sciences; Land Use and Land Cover; Google Earth Engine | Hansen and Loveland (2011); Huang et. al (2017); Nguyen et. al (2019) | Coding Exercise (optional) |
| **Week 14** 11/22* 11/24 -11/28 is a university holiday | **Applications – Part V:** Global Remote Sensing; Humanitarian | Li (2015); National Academy of Sciences (2019) | Reading Assignment 7 |
| **Week 15** 11/29 | **Applications – Part VI:** Decision Support Systems; Remote Sensing enabled Dashboards | Sharifi (1999); Gao and Zhang (2021) | Project Presentation |
| **Exam Week** 12/8 – 12/15 | **Final Course Project** | None | Report 2 |

## Statement on Academic Conduct and Support Systems

***Academic Conduct***

Plagiarism – presenting someone else's ideas as your own, either verbatim or recast in your own words – is a serious academic offense with serious consequences. Please familiarize yourself with the discussion of plagiarism in *SCampus* in Part B, Section 11, "Behavior Violating University Standards" policy.usc.edu/scampus-part-b. Other forms of academic dishonesty are equally unacceptable. See additional information in *SCampus* and university policies on scientific misconduct, http://policy.usc.edu/scientific-misconduct.

***Support Systems***

*Counseling and Mental Health– (213) 740-9355 – 24/7 on call*
engemannshc.usc.edu/counseling
Free and confidential mental health treatment for students, including short-term psychotherapy, group counseling, stress fitness workshops, and crisis intervention.

*National Suicide Prevention Lifeline – 1 (800) 273-8255 – 24/7 on call*
www.suicidepreventionlifeline.org
Free and confidential emotional support to people in suicidal crisis or emotional distress 24 hours a day, 7 days a week.

*Relationship and Sexual Violence Prevention Services (RSVP) – (213) 740-9355(WELL), press "0" after hours – 24/7 on call*
studenthealth.usc.edu/sexual-assault
Free and confidential therapy services, workshops, and training for situations related to gender-based harm.

*Office of Equity and Diversity (OED) – (213) 740-5086 |Title IX Compliance – (213) 821-8298*
equity.usc.edu, titleix.usc.edu
Information about how to get help or help someone affected by harassment or discrimination, rights of protected classes, reporting options, and additional resources for students, faculty, staff, visitors, and applicants.

*Reporting Incidents of Bias or Harassment– (213) 740-5086 or (213) 821-8298*
usc-advocate.symplicity.com/care_report
Avenue to report incidents of bias, hate crimes, and microaggressions to the Office of Equity and Diversity | Title IX for appropriate investigation, supportive measures, and response.

*The Office of Disability Services and Programs – (213) 740-0776*
dsp.usc.edu
Support and accommodations for students with disabilities. Services include assistance in providing readers/notetakers/interpreters, special accommodations for test taking needs, assistance with architectural barriers, assistive technology, and support for individual needs.

*USC Campus Support and Intervention – (213) 821-4710*
uscsa.usc.edu
Assists students and families in resolving complex personal, financial, and academic issues adversely affecting their success as a student.

*Diversity at USC – (213) 740-2101*
diversity.usc.edu
Information on events, programs and training, the Provost's Diversity and Inclusion Council, Diversity Liaisons for each academic school, chronology, participation, and various resources for students.

*USC Emergency - UPC: (213) 740-4321, HSC: (323) 442-1000 – 24/7 on call*
dps.usc.edu, emergency.usc.edu
Emergency assistance and avenue to report a crime. Latest updates regarding safety, including ways in which instruction will be continued if an officially declared emergency makes travel to campus infeasible.

*USC Department of Public Safety – - UPC: (213) 740-6000, HSC: (323) 442-120 – 24/7 on call*
dps.usc.edu
Non-emergency assistance or information.

***Resources for Online Students***
The Course Blackboard page and the GIST Community Blackboard page have many resources available for distance students enrolled in our graduate programs. In addition, all registered students can access electronic library resources through the link https://libraries.usc.edu/. Also, the USC Libraries have many important resources available for distance students through the link: https://libraries.usc.edu/faculty-students/distance-learners. These include instructional videos, remote access to university resources, and other key contact information for distance students.