

Course Change Request

New Course Proposal

Date Submitted: 11/25/19 3:51 pm

Viewing: **GGG 426 : Surface and Atmosphere Remote Sensing**

Last edit: 11/25/19 3:51 pm

Changes proposed by: nburtch

In Workflow

1. **GGG Chair**
2. **SC Curriculum Committee**
3. SC Associate Dean
4. Assoc Provost- Undergraduate
5. Registrar-Courses
6. Banner

Programs referencing this course

[SC-BS-GEOG: Geography, BS](#)

[GIS: Geographic Information Systems Minor](#)

Approval Path

1. 11/25/19 4:15 pm
Nathan Burtch
(nburtch): Approved for GGG Chair

Are you completing this form on someone else's behalf?

No

Effective Term: Fall 2020

Subject Code: GGS - Geography & Geoinformation Science **Course Number:** 426

Bundled Courses:

Is this course replacing another course? No

Equivalent Courses:

Catalog Title: Surface and Atmosphere Remote Sensing

Banner Title: Surface & Atm Remote Sensing

Will section titles vary by semester? No

Credits: 3

Schedule Type: Lecture

Hours of Lecture or Seminar per week: 3

Repeatable: May be only taken once for credit, limited to 3 attempts (N3) **Max Allowable Credits:** 9

Default Grade Mode: Undergraduate Regular

Recommended Prerequisite(s):

Recommended Corequisite(s):

Required Prerequisite(s) / Corequisite(s) (Updates only): GGS 379 or GGS 416

Registrar's Office Use Only - Required Prerequisite(s)/Corequisite(s):

And/Or	(Course/Test Code	Min Grade/Score	Academic Level)	Concurrency?

Registration Restrictions (Updates only):

Registrar's Office Use Only - Registration Restrictions:

Field(s) of Study:

Class(es):

Level(s):

Degree(s):

School(s):

Catalog Description: Theory and methods for remote sensing both surface and atmospheric phenomenon. Topics include surface and atmospheric information retrieval such as surface radiation budget, land cover/land use, snow/ice

detection, surface temperature, soil moisture, and precipitation detection. Both passive and active remote sensing systems, with a focus on satellite-based systems, will be utilized.

Justification: This course was offered as a special topics course in the Spring of 2019. The course is designed to add additional depth in the department's remote sensing offerings. This undergraduate course will be added to our advanced techniques course offerings in both the GEOG BS and GIS minor

Does this course cover material which crosses into another department? No

Learning Outcomes:

Attach Syllabus [SurfAtmoRS_proposal.pdf](#)

Additional Attachments

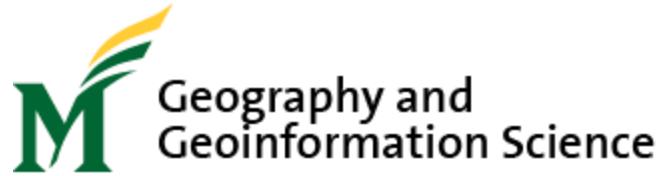
Staffing: This course has been designed by Dr. Donglian Sun, who will be the primary instructor of this course. Additional GGS faculty with remote sensing experience can also teach the course as needed.

Relationship to Existing Programs: GGS 426 will be offered as an Advanced Techniques course in the BS GEOG degree, and as an elective in the GIS minor

Relationship to Existing Courses: This course expands the depth of remote sensing course offerings in GGS. After students develop a background in remote sensing in either GGS 379 or GGS 416, GGS 426 is a course that will develop further remote sensing techniques.

Additional Comments:

Reviewer Comments



GGS426/GGS626: Surface and Atmosphere Remote Sensing

SYLLABUS

Classroom/Time: TBA

Course Instructor: Dr. Donglian (Lilian) Sun

E-mail: dsun@gmu.edu

Phone: 703-993-4736 (Dr. Sun)

Office hours: TBA

Office: EXPL 2407

GENERAL INFORMATION

Course Overview: This course is designed to give students with Earth science and remote sensing background a thorough introduction to gathering an overview to Remote Sensing of surface and atmosphere, such as surface and atmospheric information retrieval, including surface radiation budget, land cover/land use, snow/ice, surface temperature, soil moisture, precipitation retrieval from passive and active satellite observations. The main emphasis of this course is satellite remote sensing of the Earth surface and atmosphere parameters. Some topics are suggested to be covered, but can be modified according to students' interests. Project presentation and paper (20 pages including figures and tables) are required.

Prerequisites: For GGS 426, either GGS 379 or GGS 416 are required. For GGS 626, it is recommended that GGS 579 is completed.

COURSE MATERIALS

Course on-line materials. The GGS426/626 course site is at <https://courses.gmu.edu>, where all announcements, class materials, exams and grades will be posted.

Text Books: In this course text books are used as **reference material**. A list of books is provided, so the students can select the one that adapts better to their needs.

- Emilio Chuvieco. Fundamentals of Satellite Remote Sensing: An Environmental Approach. CRC Press, Second Edition. ISBN 9781498728058
- Shunlin Liang. Quantitative Remote Sensing of Land Surfaces. John Wiley & Sons, ISBN:9780471281665 |Online ISBN:9780471723721 |DOI:10.1002/047172372X

- Campbell, J.B. and Wynne, R. H. 2011. Introduction to Remote Sensing. Guildford Press, New York. 5th Edition. ISBN 978-1-60918-176-5
- Jensen, J.R., Remote Sensing of the Environment - An Earth Resource Perspective, 592 pp., Prentice Hall, Upper Saddle River, NJ, 2007. ISBN: 0131889508, Second Edition
- Jones H.G., Vaughan R.A. Remote Sensing of Vegetation: Principles, Techniques, and Applications. Oxford University Press. ISBN-10: 0199207798; ISBN-13: 978-0199207794
- Richards, J. A. 2013. Remote Sensing Digital Image Analysis. An Introduction. Springer-Verlag, Berlin, Heidelberg. Fifth Edition. ISBN 978-3-642-30061-5
- Chuvieco, E. and Huete, A. 2010. Fundamentals of Remote Sensing. CRC Press (Taylor & Francis Group), Boca Raton (Florida). ISBN 978-0-415-31084-0

Date	Topic	Instructor
Jan. 22	Introduction to remote sensing	Sun, GMU
Jan. 29	Surface temperature derivation from satellite observations	Sun, GMU
Feb. 5	Remote sensing surface albedo	Sun, GMU
Feb. 12	Remote sensing surface radiation budget	Sun, GMU
Feb. 19	Remote sensing vegetation	Sun, GMU
Feb. 26	Surface type and land cover/land use classification from satellite observations	Sun, GMU
Mar. 5	Snow/Ice cover mapping and monitoring from satellites	Dr. Peter Romanov, NOAA
Mar. 12	Spring Break	
Mar. 19	Precipitation retrieval from satellite observations	Sun, GMU
Mar. 26	Remote sensing soil moisture	Dr. Jerry Zhan, NOAA
Apr. 2	Remote sensing of tropical cyclone/hurricanes	Sun/GMU
Apr. 9	Remote sensing climate change	Sun/GMU
Apr. 16	Remote sensing wild fire	Sun/GMU
Apr. 23	Remote sensing air quality	Dr. Daniel Tong, NOAA
Apr. 30	Aerosols and volcanic ash detection from satellite observations	Sun/GMU
May. 7	Project presentation/reading day	Students
May. 14	Project paper due	

Grading

The final grade is computed out of 100 points using the following letter mapping:

Undergraduate

100-96 A+; 95-93 A; 92-90 A-;

89-87 B+; 86-83 B; 82-80 B-;

79-77 C+; 76-73 C; 72-70 C-;

69-60 D; < 60 F

Graduate

100-96 A+; 95-93 A; 92-90 A-;

89-87 B+; 86-83 B; 82-80 B-;

79-70 C;

< 70 F

Attendance, Participation and Preparation (10% Graduate, 15% Undergraduate)

Attendance will be taken at the beginning of each class. Students more than 15 minutes late will be considered absent. Two absences are allowed with no penalty. One point will be taken for each additional absence up to a total of 12 absences. Students absent for more than 12 lectures will receive an F. Oral questions about the course material and the reading assignments will be asked and students are expected to actively participate in the discussion.

Homework (20% Graduate, 25% Undergraduate)

Students will be divided in groups of 3-4 students. In answering homework, students are encouraged to use for their research any sources they believe appropriate. Students will be asked to provide an oral summary of their findings in class.

Midterm (15% Graduate, 15% Undergraduate)

The midterm covers material from both lectures and assignments. This is an individual, closed book, in class exam.

Final exam (15% Graduate, 15% Undergraduate)

The final exam covers material from both lectures and assignments. This is an individual, closed book, in class exam.

Final Project (40% Graduate, 30% Undergraduate)

Each student will complete a final project. Graduate student projects will be more in depth and require a presentation during the last day of the course. More details will be provided during the semester.

Policies

Policy on Absence

Students are expected to actively participate in the lecture, lab and class discussion. When a student misses a lecture, he/she is invited to let the instructor know in advance. The student is still responsible for the material and assignments covered in the lecture. Refer to the attendance section of the Syllabus for grading information.

Policy on Exams

The midterm and the final exams are mandatory. There is no make up exam, unless for extreme circumstances. If a student does not take the midterm exam, he/she will receive a 0 score. If a student does not take the final exam, he/she will receive an F grade.

Policy on Late Work

Homework will be due after two weeks of the assignment. 2 points will be taken for each 24 hours past the due date.

Policy on Reading Assignments

Students are required to read the book chapter relative to each lecture BEFORE coming to class. Questions about the text will be asked during the lecture, and students are expected to be able to answer them.

University Policies

The University Catalog, <http://catalog.gmu.edu>, is the central resource for university policies affecting student, faculty, and staff conduct in university academic affairs. Other policies are available at <http://universitypolicy.gmu.edu/>. All members of the university community are responsible for knowing and following established policies.

GMU EMAIL ACCOUNTS

Students must use their Mason email accounts-either the existing MEMO system or a new MASONLIVE account to receive important University information, including messages related to this class. See <http://masonlive.gmu.edu> for more information.

Honor Code

Students must strictly follow the honor code, both for individual and team work. No exception will be made. University policy requires that faculty members report incidents of Honor Code Violation. Scholastic dishonesty includes but is not limited to plagiarism (reference your sources and quotations), copying others' work, limiting others' access to course materials, sabotaging others' work, turning in the same paper or project for two classes without permission from all instructors, and many other things. You are responsible for the GMU Scholastic Honor Code, found in the GMU University Catalogue.

Students with Disabilities

If you are a student with a disability and you need academic accommodations, please see me and contact the Office of Disability Resources at 703/993-2474. All academic accommodations must be arranged through that office.

Class Cancellation

If a class is cancelled due to inclement weather or other reasons, the syllabus will be updated as early as possible. Best efforts will be made to send each student an email with information on the cancellation of class. Make up classes will be scheduled during the next lecture. When an exam is cancelled, it will be given during the next lecture.