

Cairo University
Faculty of Engineering
Computer Engineering Department



Remote Sensing and Satellite Imagery

Dr. Sandra Wahid

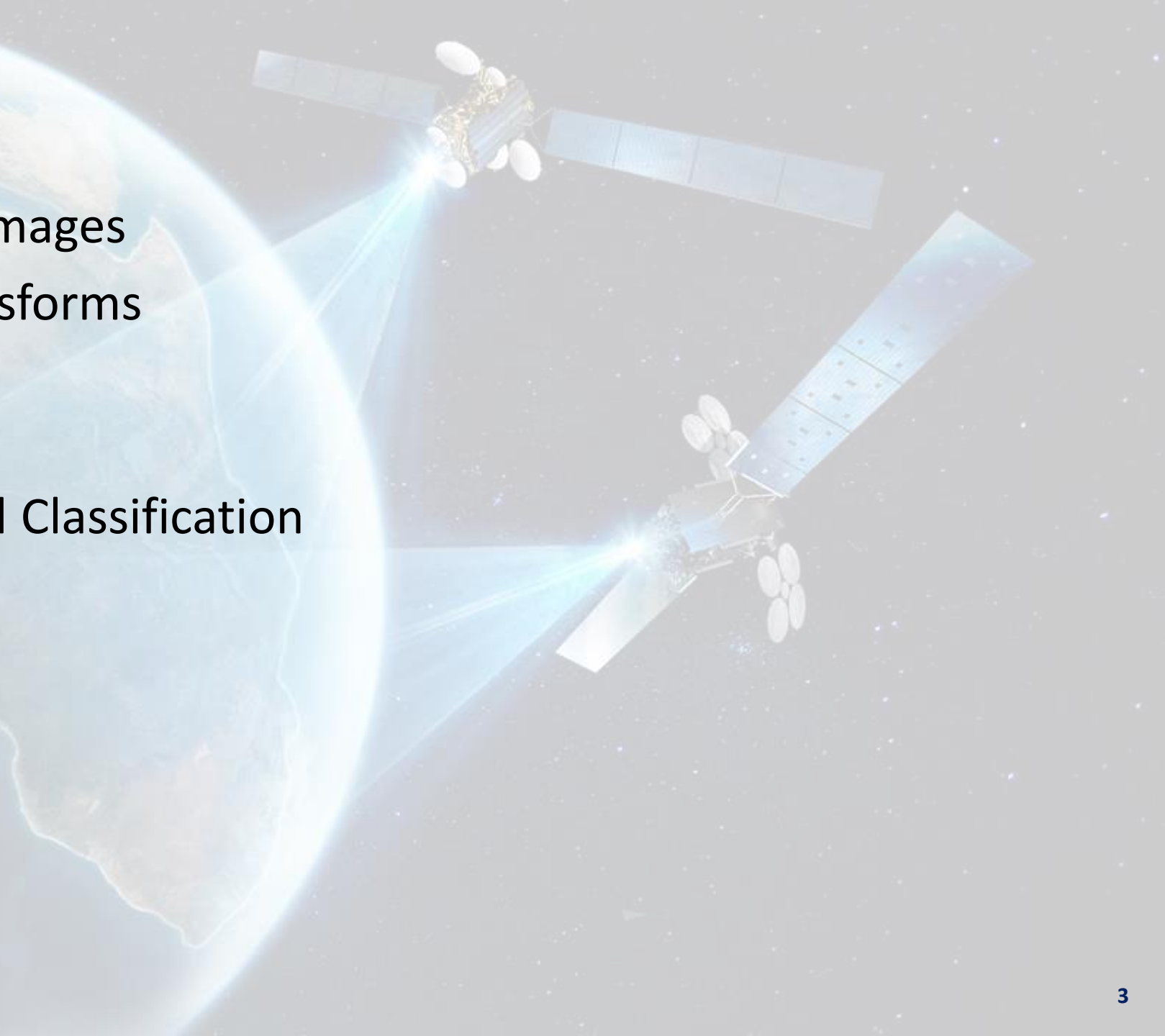


Instructor

- Dr. Sandra Wahid Amin Rizkallah
- Email: sandrawahid@hotmail.com

Course Contents

- Remote Sensing Image Data
- Correcting and Registering Images
- Spectral Domain Image Transforms
- Supervised Classification
 - Maximum Likelihood
- Clustering and Unsupervised Classification
 - ISODATA
- Deep Learning Techniques
 - CNN, U-Net
- Change Detection
- Generating Satellite Images
 - GANs



Learning Outcomes (LOs)

The background of the slide features a large, semi-transparent image of the Earth, showing continents and oceans. Overlaid on the right side of the Earth is a satellite in space. The satellite has a central body with various instruments and two long, rectangular solar panel arrays extending outwards. A bright, blueish-white beam of light originates from the satellite and points towards the Earth's surface, specifically towards the African continent. The overall scene is set against a dark, starry space background.

- Apply image correction and registration techniques. A1.
- Apply spectral domain image transforms. A1.
- Implement image classification techniques. C2.
- Describe and apply deep learning techniques on images. C1.
- Describe and analyze change detection techniques. C1.
- Apply state-of-the-art techniques on satellite images. C1.

Grades' Distribution

- Final Exam: **60** grades
- Midterm Exam: **5** grades
- Project: **15** grades
- Labs/Assignments: **15** grades
- Quizzes: **5** grades
- Lecture's Bonus: up to **3** grades

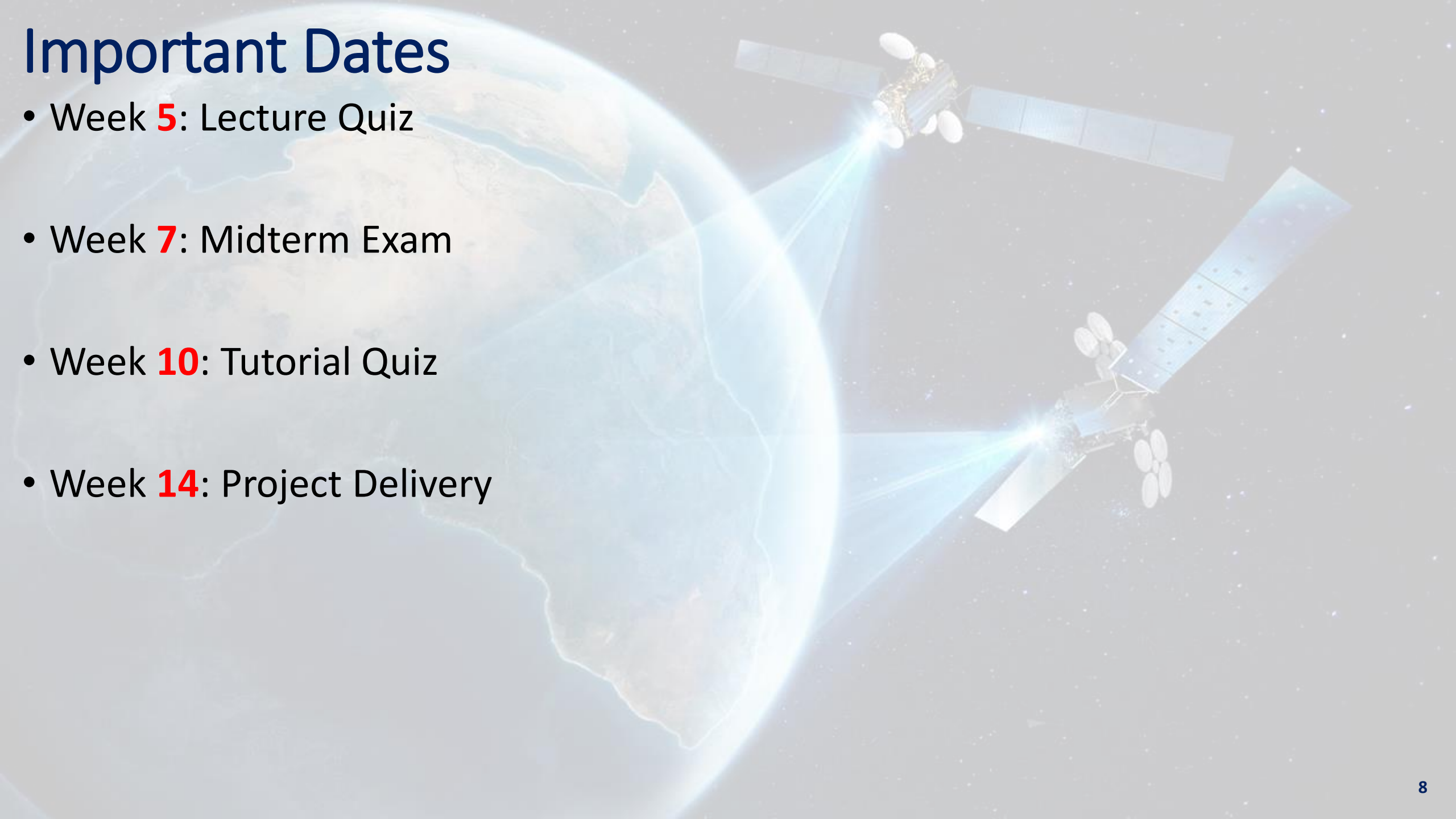


Written Exams Policy

- Restricted exams:
 - you are allowed to bring only **1 A4** sheet (**2 sides**)
→ **Hardcopy** (softcopies are not allowed).

References

- “Remote Sensing Digital Image Analysis”. Fifth Edition. John A. Richards.
- “Introductory Digital Image Processing. A Remote Sensing Perspective”. Fourth Edition. John R. Jensen.
- “Deep Learning”. MIT press. Ian Goodfellow, Yoshua Bengio, and Aaron Courville.
- “U-net: Convolutional networks for biomedical image segmentation”. Olaf Ronneberger, Philipp Fischer, and Thomas Brox.
- “Image Analysis, Classification, and Change Detection in Remote Sensing. With Algorithms for Python”. Fourth edition. Morton John Canty.



Important Dates

- Week **5**: Lecture Quiz
- Week **7**: Midterm Exam
- Week **10**: Tutorial Quiz
- Week **14**: Project Delivery

A composite image showing two satellites in space. The satellite in the upper right has a gold-colored body and two long, rectangular solar panel arrays. The satellite in the lower right has a blue body and a large, rectangular solar panel array. Both satellites are emitting bright blue beams of light towards the Earth. The Earth is shown on the left side of the image, with the African continent and parts of Europe and Asia visible. The background is a deep black space filled with numerous small, distant stars.

Thank You