Second Term Exam A. Y. 2021 – 2022 (Jun – Jul 22)
Programme Name : M. Tech. Geoinformatics 2nd Sem Exam

Course Code: MTGI1201 Name of the course: Digital Photogrammetry
Max Marks: 60 Duration: 3 hrs

Instructions:
(a) Write your answers clearly and legibly.
(b) Write all the parts of the same question together.
(c) All questions carry equal marks.
(d) Write precise and to-the-point answers.
(e) Use illustrations and flowcharts where required.

Q.1 Answer any two
a. What is an affine transformation? Write the matrix representation of the affine transformation in 2D for (i) rotation, (ii) scaling and (iii) shear. 5
b. Define interior orientation. Write a short note on interior orientation. 5
c. Explain the concept of circle of confusion. 5

Q.2 Answer any two:
a. Explain the various parameters for image capture. 5
b. Write a short note on aerial photogrammetry. 5
c. What are the errors that can creep in during a flight? 5

Q.3 Answer any two:
a. What is a vertical photograph? Explain the geometry of the vertical photograph with a diagram. 5
b. Write a short note on the planning and execution of a terrestrial photogrammetry project. 5
c. Explain orientation procedure with metric images with three line sensor camera. 5

Q.4 Answer any two
a. Explain two step combined orientation of two images. 5
b. Explain relative orientation for highly tilted images. 5
c. Write a short note on absolute orientation. 5

Q.5 Answer any two:
a. Explain planimetric adjustment. 5
b. What are observation and normal equations in the process of bundle block adjustment. 5
c. Write a short note of analog and analytical stereoplotters. 5

Q.6 Answer any two
a. Write a short note on semi-automated processing for measurement of buildings. 5
b. Explain orthophotos of curved objects. 5
c. Write a short note on photo models. 5

Second Term Exam A. Y. 2021 – 2022 (Jun – Jul 22)
Programme Name : M. Tech. (Geoinformatics) 2nd Sem Exam

Course Code: MTGI1203 | Name of the course: Research Methodology
Max Marks: 60 | Duration: 3 hrs

Instructions:

(a) Write your answers clearly and legibly.
(b) Statistical test values and table values are provided in the question paper itself. There is no need for any other document for statistical values.
(c) Write precise and to-the-point answers.
(d) Use illustrations and flowcharts where required.

Q.1 Answer **any two**

a. Write a short note on literature review. 5
b. What are the different steps for defining a research problem? 5
c. What are different techniques involved in defining a research problem? 5

Q.2 Answer **any two**

a. What is the need of research design? Explain. 5
b. What are basic principles of experimental design? Explain. 5
c. Write a short note on various sampling designs. 5

Q.3 Answer **any two**

a. Explain primary and secondary data. 5
b. Write short notes on the methods of data collection. 5
c. What is a randomized block experiment? 5

Q.4 Answer **any two**

a. What are different measures of dispersion? Explain each with short notes. 5
b. Write a short note on Bayes' theorem. 5
c. What are the different probability distributions? Write with short notes. 5

Q.5 Answer **any two**

a. Explain Chi-square test. 5
b. Explain the process of conducting two-way ANOVA. 5
c. Write a short note on the Mann-Whitney test. 5

Q.6 Answer **any two**

a. Write a short note on summarizing literature. 5
b. What is bibliography? What is reference? 5
c. Explain the different bibliography management tools. 5

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Program: Application of Geoinformatics — SEM –II
Course: M.tech Geoinformatics — Marks: 60
Course Code: MTGI1205

Instructions to the students
1. Each question carries 10 marks.
2 All questions are compulsory
3. Illustrate your answers with neat sketches, diagram etc. wherever necessary
4. If some part or parameter is noticed to be missing, you may appropriately assume it and should mention it clearly

	Marks
Q1. Solve any two	
a) State and explain all the application of Integral Pest Management.	(5)
b) Explain use of geoinformatics in nitrogen mangement	(5)
c) Discuss site specific fertility management in geoinformatics.	(5)
Q2. Solve any two	
a) Explain use of geoinformatics for environmental risk management	(5)
b) Explain applications of geoinformatics in public health	(5)
c) Discuss in brief summary about spatial clustering of health event.	(5)
Q3. Solve any two	
a) Explain need of urban growth modeling.	(5)
b) Discuss multi criteria analysis for route design in Geoinformatics	(5)
c) Explain spatial patterns of urban growth	(5)
Q4. Solve any one	
a) Write a short note on spatial theory of crime	(10)
b) Examine identifying crime hotspot	(10)
Q5. Solve any one	
a) Explain watershed segmentation	(10)
b) Illustrate the stream channel morphology	(10)
Q6. Solve any two	
a) Explain use of geoinformatics for real estate and property valuation	(5)
b) State and explain Geoinformatics for understanding retail property	(5)
c) Short note on Spatial analysis for commercial office property	(5)

End of paper

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Program :M.TechGeoinformatics — Sem –II
Course :Google Earth Engine and Programming — Marks : 60
Course Code :MTGI1204 — Time:3hr.

Instructions to the students

1. Each question carries 10 marks.
2. All questions are compulsory
3. Illustrate your answers with neat sketches , diagram etc wherever necessary
4. If some part or parameter is noticed to be missing ,you may appropriately assume it and should mention it clearly

Marks

Q1. Solve **any two**

a) Explain scripts ,docs tabs in code editor (5)
b) Distinguish between Earth Engine objects from other JavaScript objects (5)
c) How to use Image and ImageCollection in GEE (5)

Q2. Solve **any two**

a) Use "FAO/GAUL_SIMPLIFIED_500m/2015/level2" dataset and Write JS code to display Maharashtra in Red, Kerala in blue and Madhya Pradesh in Green (5)
b) What is use of Geometry object. (5)
c) How to read Features and FeaturesCollection in GEE using JS (5)

Q3. Solve **any two**

a) How to use for loops GEE Programming (5)
b) Illustrate the use of map() and reduce() operations (5)
c) Explain ee.Image(),Map.setCenter() (5)

Q4. Solve **any two**

a) How Mathematical operations and Expressions are performed in GEE (5)
b) Elaborate Image visualization parameters(5)
c) Write code in JS to get an image out of the Sentinel-2 surface reflectance collection filter bydate , geometryandsort by cloud percentage and display. (5)

Q5. Solve **any two**

a) Write and explain Expression to calculate EVI using'LANDSAT/LC08/C02/T1_TOA/LC08_044034_20140318' image (5)
b) Explain use of *Reduce* operation in parallel computing code(5)
c) What are the accuracy measures (5)

Q6. Solve **any two**

a) What is supervised classification? Compare SVM with Decision Tree (5)
b) Elaborate how to calculate area of of Image pixel and features in GEE (5)
c) Write note on Change detection in GEE. (5)

End ofpaper

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Program : M.Tech Geoinformatics | Sem –II
Course : Programming with python | Marks : 60
Course Code : MTGI1202 | Time: 3 hr.

Instructions to the students

1. Each question carries 10 marks.
2 All questions are compulsory
3. Illustrate your answers with neat sketches , diagram etc wherever necessary
4. If some part or parameter is noticed to be missing ,you may appropriately assume it and should mention it clearly

Marks

Q1. Solve **any two**

a) Explain lookup tables with an example. (5)
b) What are the different image formats? Explain various image reading libraries in python. (5)
c) Illustrate Multi band images with example. (5)

Q2. Solve **any two**

a) Explain radiometric correction with speckle slicing and multilook. (5)
b) Infer importance of sharpening mechanisms and explain any one in detail. (5)
c) Define basic and adaptive smoothing and explain smoothing filters. (5)

Q3. Solve **any two**

a) With proper proof explain working of image to image registration. (5)
b) Derive equation for slope and aspect w.r.t image enhancement and correction (5)
c) Outline the features of image registration? Enlist its applications. (5)

Q4. Solve **any two**

a) Difference between SVM and multiclass SVM. (5)
b) Explain Gaussian kernel classification in detail. (5)
c) Write algorithm for probabilistic label relaxation. (5)

Q5. Solve **any two**

a) Define accuracy assessment and write mathematical equation for the same. (5)
b) Outline anomaly detection: Kernel RX algorithm briefly.. (5)
c) What is Kernel substitution? Derive equation for the same. (5)

Q6. Solve **any two**

a) Elaborate the term "Normalization" and explain maximum likelihood classification (5)
b) What is unsupervised classification. Explain k-means clustering in detail. (5)
c) Outline the importance of image segmentation and explain feature matching. (5)

End of paper

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Program : M. Tech. (Geoinformatics) Sem –II
Course : Computer Vision and Pattern Recognition Marks : 60
Course Code : MTGI1207 Time: 3 hr.

Instructions to the students
1. Each question carries 10 marks.
2 All questions are compulsory
3. Illustrate your answers with neat sketches , diagram etc wherever necessary
4. If some part or parameter is noticed to be missing ,you may appropriately assume it and should mention it clearly

Marks

Q1. Solve **any two**
a) Explain Back propagation algorithm with example. (5)
b) Explain architecture of artificial neural networks. (5)
c) Put your thoughts on "Need of Computer Vision" in the study of GI. (5)

Q2. Solve **any two**
a) Explain the role of object detection in face recognition and pedestrian detection. (5)
b) Derive steps for Intelligent photo editing. (5)
c) Enlist different types of segmentations. Explain what is panoptic segmentation? (5)

Q3. Solve **any two**
a) Explain edge detection and contour tracking. (5)
b) What is large scale feature matching? Enlist feature matching algorithms. (5)
c) Difference between feature detection and feature descriptors in brief. (5)

Q4. Solve **any two**
a) What is image stitching? Explain concept of image stitching with a example. (5)
b) Highlight point on bundle adjustment in global alignment with steps. (5)
c) Write short not on: i) parallax removal ii) blending. (5)

Q5. Describe in brief about: **(any two)**
a) Denoising and blur removal. (5)
b) Image matting and compositing. (5)
c) Texture analysis and synthesis. (5)

Q6. Describe in brief about: **(any two)**
a) Range data and Merging in 3D scanning. (5)
b) Steps involved in Surface representation. (5)
c) Maps and Albedos in Model based reconstruction. (5)

End of paper