Post Graduate Diploma in Geo Informatics – Syllabus with proposed changes

Semester I — Existing Scheme

Code	Subject	Credits			Hours			Theory			Practical			Total
		T	P/Tu	To	T	P	To	I	E	To	I	E	To	
KPSE101	Principles of Remote Sensing & GPS	4		4	60		60	15	35	50				50
KPSE101P	Principles of Remote Sensing & GPS		2	2		60	60				35	15	50	50
KPSE102	Digital Image Processing	4		4	60		60	15	35	50				50
KPSE102P	Digital Image Processing		2	2		60	60				35	15	50	50
KPSE103	Minor Project/OJT		6	6		270	270				100	100	200	200
SEC Total		**8**	**10**	**18**	**120**	**390**	**510**	**30**	**70**	**100**	**170**	**130**	**300**	**400**
KPGE101	Fundamentals of GIS & Digital Cartography	4		4	60		60	15	35	50				50
KPGE101P	Fundamentals of GIS & Digital Cartography		2	2		60	60				35	15	50	50
KPGE102	Basic of Statistics, Computers & Communication	2	4	6	30	60	90	30	70	100				100
GEC Total		**6**	**6**	**12**	**90**	**120**	**210**	**60**	**140**	**200**				**200**
Total		**14**	**16**	**30**	**210**	**510**	**720**	**90**	**210**	**300**	**170**	**130**	**300**	**600**

Semester II — Existing Scheme

Code	Subject	Credits			Hours			Theory			Practical			Total
		T	P	To	T	P	To	I	E	To	I	E	To	
KPSE104	Project Oriented Dissertation		12	12		540	540				100	100	200	200
KPSE105	Case Study on Contemporary Area of GI		6	6		270	270				100	100	200	200
SEC Total		**0**	**18**	**18**		**820**	**820**				**200**	**200**	**400**	**400**
KPGE101	Advances in Geospatial Technology	4		4	60		60	15	35	50				50
KPGE101	Advances in Geospatial Technology		2	2		60	60				35	15	50	50
KPGE102	Applications of Remote Sensing	4		4	60		60	15	35	50				50
KPGE102	Applications of Remote Sensing		2	2		60	60				35	15	50	50
GEC Total		**8**	**4**	**12**	**120**	**120**	**240**	**30**	**70**	**100**	**70**	**30**	**100**	**200**
Total		**8**	**22**	**30**	**120**	**940**	**1060**	**230**	**270**	**500**	**105**	**45**	**150**	**600**

The above scheme is change for PGD-GIS, as the University has planned to execute a 6 by 6 model, wherein the student is engaged with the university for 6 months studying all the subjects and the next 6 months, the student is engaged with the Industry partner for On Job Training (OJT). The proposed scheme is as follows

Code	Subject	Credits			Hours			Theory			Practical			Total
		T	P/T	To	T	P/T	To	I	E	To	I	E	To	
KPSE 101	Principal of Remote Sensing & GPS	4		4	60		60	15	35	50				50
KPSE 101P	Principal of Remote Sensing & GPS-Lab		2	2		60	60				35	15	50	50
KPSE 102	Digital Image Processing	4		4	60		60	15	35	50				50
KPSE 102P	Digital Image Processing-Lab		2	2		60	60				35	15	50	50
SEC		**8**	**4**	**12**	**120**	**120**	**240**	**30**	**70**	**100**	**70**	**30**	**100**	**200**
KPGE 101	Fundamentals of Geographic Information Sciences and Digital cartography	2		2	30		30	15	35	50				50
KPGE 101P	Fundamentals of Geographic Information Sciences and Digital cartography - Lab		2	2		60	60				35	15	50	50
KPGE 102	Basics of Statistics and Computers	2	2	4	30	60	90	30	70	100				100
KPGE 103	Advances in Geospatial Technology	4		4	60		60	15	35	50				50
KPGE 103P	Advances in Geospatial Technology-Lab		2	2		60	60				35	15	50	50
KPGE 104	Applications of Remote Sensing	4		4	60		60	15	35	50				50
KPGE 104P	Applications of Remote Sensing-Lab		2	2		60	60				35	15	50	50
GEC		**12**	**8**	**20**	**180**	**240**	**420**	**75**	**175**	**250**	**105**	**45**	**150**	**400**
Total		20	12	32	300	360	660	105	245	350	275	75	250	600

Semester 1 Proposed

Semester 2 Proposed

Code	Subject	Credits			Hours			Theory			Practical			Total
		T	P/T	To	T	P	To	I	E	To	I	E	To	
KPSE104	Project Oriented Dissertation/OJT		24	24		1080	1080				245	105	350	350
SEC			**24**	**24**		**1080**	**1080**				**245**	**105**	**350**	**350**
KPSE105	Case Study on contemporary areas of Geoinformatics		4	4		120	120				100	100	200	200
GEC			**4**	**4**		**120**	**120**				**100**	**100**	**200**	**200**
Total			**28**	**28**		**910**	**910**				**345**	**205**	**550**	**550**

All the theory subjects are adjusted in semester 1 while semesters 2 consist of OJT (On Job Training) at Industry's end and Case study to be carried by each student.

Proposed Changes:

Semester 1

S.No	Existing document Paper II (Digital Image Processing)	Proposed changes Paper II (Digital Image Processing)
1	**Practicals:** Lab 1. Haze and noise reduction Lab 2. Absolute radiometric correction Lab 3. Relative radiometric correction Lab 4. Perform the various band ratio calculations Lab 5. Image enhancement and filtering: Lab 6. Data compression techniques (PCA, TCA) Lab 7. Resolution merging and its assessment Lab 8. Unsupervised classification Lab 9. Supervised classification Lab 10. Object oriented classification Lab 11 Knowledge base classification Lab 12. Accuracy assessment Lab 13. Visualization and presentation	Lab 1. Haze and noise reduction Lab 2. Absolute radiometric correction Lab 3. Relative radiometric correction Lab 4. Perform the various band ratio calculations Lab 5. Image enhancement and filtering: Lab 6. Data compression techniques (PCA) Lab 7. Unsupervised classification Lab 8. Supervised classification Lab 9. Object oriented classification Lab 10. Accuracy assessment Lab 11. Visualization and presentation

S.No	Existing document Paper III (Fundamental of Geographic Information Sciences and Digital Cartography)	Proposed changes Paper III (Fundamental of Geographic Information Sciences and Digital Cartography)
1	**Unit II (Geographical Data, Model and Data Input):** Geographical Data Models: Fundamentals of data storage: entities or fields, Introduction to database systems:	**Unit II (DATA STORAGE AND SPATIAL DATA INPUT):**

	Definition, purpose, schema, RDBMS, relationship and primary/secondary/composite key. Basic file structure, types of database-hierarchical systems, Network systems, Relational systems and Object-oriented database systems (OODS); Relational Models	Fundamentals of data storage: entities or Fields, Introduction to database system: Definition, Purpose, Schema, Relationship and primary/secondary/composite key. Introduction to spatial data input.
2	**Unit III (Spatial Data Input and Editing):** Spatial and Non-spatial database, spatial data model: Geo relational Vector data model, Object based vector model, Geodatabase, Raster data model, GIS data source and collection, Methods of data capture-scanning, digitization and associated errors; Conversion from other digital sources, attribute data input and management , creating digital data-remote sensing; GPS; data exchange; metadata; Edge matching; Digital output options	**Unit III (SPATIAL DATA STORAGE)** Spatial and Non spatial data base, spatial data model, Geodatabase, Introduction to Postgres, Spatial representation of data, Spatial relationship, Spatial Indexing methods
3	**Unit IV (Data storage, Integration and Management):** Data retrieval; Data compression; Thematic mapping; Image storage formats, Types of uncertainty in a GIS, Sources of errors in GIS database; Data quality parameters: Positional accuracy, Attribute accuracy, Logical consistency, Completeness lineage, Public access to geographic information; Digital libraries, National & Global Standard - NSDI, GSDI; Global geospatial portals, OGC.	**Unit IV (DATABASE SOURCES)** Public access to geographic information data; Digital libraries, National & Global Standard - NSDI, GSDI; Global geospatial portals, OGC.
4	**Unit V (Introduction to vector and Raster data analysis)**: Attribute data query, SQL, Logical, Boolean, Arithmetical operation and function, Topological relationships; Creation of topology and error correction; Overlay operations (union and intersection), Feature base topological function –buffer, Eliminate, dissolve, Layer based overlay analysis: point to polygon, line to polygon, clip, erase, split, identity, union and intersection, Network analysis; Raster Data base and structure, Local operations, Neighborhood operations, Zonal operations,	**Unit V (INTRODUCTION TO VECTOR & RASTER DATA ANALYSIS)** SQL, Logical, Boolean, Arithmetical operation and function, Topological relationships; Overlay operations (union and intersection), Feature base topological function –buffer, Eliminate, dissolve, Layer based overlay analysis: point to polygon, line to polygon, clip, erase, split, identity, union and intersection, Network analysis; Raster Data base and structure.
5	**Paper III**	**Paper III**

	Practicals: Lab 1. Analog to Digital conversion -Scanning methods Lab 2. Introduction to software Lab 3 Map Rectification, Define projection and Reprojection. Lab 4. Digital database creation -Point features, Line features, Polygon features Lab 5. Data Editing-Removal of errors -Overshoot & Undershoot, Snapping, Topology Creation Lab6: Vector Transformation – Affine and Polynomial, Co-ordinate definition. Map Bound. Lab 7. Data collection and Integration, Non-spatial data attachment working with tables Lab 8. Concept of entity and relationship Lab 9. Creation of Tables Lab 10. Concept of SQL Lab 11. Performing various actions over table Lab 12. Merging of tables by using primary key Lab 13. Maintaining database Lab 14. Dissolving and Merging Lab 15. Clipping, Intersection and Union Lab 16. Proximity Analysis Lab 17. Spatial and Attribute query and Analysis Lab18. Map algebra / Math in Raster data Lab 19. Layout generation and report Lab 20. Analysis of Toposheet Lab 21. Base map Lab 22. Updation of Toposheet from satellite imagery. Lab 23. Digital Map preparation using Dot, Isopleth and Choropleth	**Practicals:** Lab 1. Introduction to software Lab 2. Map Rectification, Define projection and Reprojection. Lab 3. Digital database creation -Point features, Line features, Polygon features Lab 4. Data Editing-Removal of errors -Overshoot & Undershoot, Snapping, Topology Creation Lab 5: Vector Transformation – Affine and Polynomial, Co-ordinate definition. Map Bound. Lab 6. Data collection and Integration, Non-spatial data attachment working with tables Lab 7. Concept of entity and relationship Lab 8. Creation of Tables Lab 9. Concept of SQL Lab 10. Performing various actions over table Lab 11. Merging of tables by using primary key Lab 12. Dissolving and Merging Lab 13. Clipping, Intersection and Union Lab 14. Proximity Analysis Lab 15. Spatial and Attribute query and Analysis Lab 16 Map algebra / Math in Raster data Lab 17. Layout generation and report Lab 18. Digital Map preparation using Dot, Isopleth and Choropleth

S.No	Existing Document Paper IV (Basics of Statistics, Computer and Communication)	Proposed changes Paper IV (Basics of statistics and computers)

1	**Unit III Correlation and Regression:** Meaning of correlation, types of correlation – positive and negative correlation, simple, partial and multiple correlation, methods of studying correlation; scatter diagram, graphic and direct method; properties of correlation co-efficient, rank correlation, coefficient of determination, lines of regression, co-efficient of regression standard error of estimate	**Unit III** **Correlation:** Meaning of correlation, types of correlation – positive and negative correlation, simple, partial and multiple correlation, methods of studying correlation; scatter diagram, graphic and direct method; properties of correlation co-efficient, rank correlation
2	**Unit IV Communication: Basics of communication**, use of communication's modern technology in geospatial world, communication interface and GIS technology, need of communication	**UNIT IV** **Regression:** Introduction to regression, lines of regression, co-efficient of regression, coefficient of determination, standard error of estimate
3	**Unit V: Introduction to computers:** types of computers, basic components of computer systems Computer Software, Operating Systems and overview of Windows. Computer Networking system, internet, use of internet in Geospatial technology.	**UNIT V** **Introduction to computers**: Basic components of computer systems, Computer networking system, Internet and use if internet in Geospatial technologies

S.No	Existing document Paper V (Advances in Geospatial Technology)	Proposed changes
1	**Unit II Thermal Remote Sensing:** Basics of Thermal Remote Sensing, Thermal Sensors, Scanners, Interpretation and Advantages of Thermal imageries. Atmospheric transmission, Kinetic and radiant temperature, Thermal properties of materials.	**Unit II** **Web GIS:** web mapping, web page basics, geospatial web services, geospatial mashups, web mapping – static and interactive web mapping, collaborative web mapping. Adding and rendering map layers to a web gis. symbolizing layers, classifying continuous variables for choropleth mapping. Building and enabling map services on the GIS server, Web Map Servers- WMS-, interoperable systems and non-interoperable systems- Web Feature Servers- Metadata standard, XML, Geographic Markup Language.
2	**Unit I: Microwave, Remote Sensing Introduction:** Electromagnetic spectrum of microwave region, Airborne and Space borne radar systems (SLAR, SAR) parameters, Introduction to Altimeter, Scatterometer, Radiometer, Radargrammetry, LiDAR Remote Sensing and Technology,	**Unit I:** **Introduction to remote sensing techniques:** Electromagnetic spectrum of microwave region, Airborne and Space borne radar systems (SLAR, SAR) parameters, Introduction to Altimeter, Scatterometer, Radiometer, Radargrammetry, LiDAR Remote Sensing and Technology, Radar

	Radar interferometer; Laser altimetry. Advanced Laser Terrain Mapping, Digital Photogrammetry, Orthophoto Generation, Types of Mosaic, Unmanned Aerial Vehicle (UAV Mapping).	interferometer; Laser altimetry. Advanced Laser Terrain Mapping, Digital Photogrammetry, Orthophoto Generation, Types of Mosaic, Unmanned Aerial Vehicle (UAV Mapping).
3	**UNIT III (Web GIS):** web mapping, web page basics, geospatial web services, geospatial mashups, web mapping – static and interactive web mapping, collaborative web mapping. Adding and rendering map layers to a web gis. symbolizing layers, classifying continuous variables for choropleth mapping. Building and enabling map services on the GIS server, Web Map Servers- WMS-, interoperable systems and non-interoperable systems- Web Feature Servers- Metadata standard, XML, Geographic Markup Language.	**Unit III** **Web GIS Implementation:** Web Map servers and Data servers, Configuration, layering, design of interfaces, Quality of Service and Security Issues in the Development of Web GIS - Performance, Security, Scalability,
4	**UNIT IV** **Web GIS Implementation:** Web Map servers and Data servers, Configuration, layering, design of interfaces, Quality of Service and Security Issues in the Development of Web GIS - Performance, Security, Scalability,	**Unit IV** **Open source GIS software:** Introduction to open source software for GIS and their uses such as QGIS. Introduction to freely available open source data
5	**Unit V Mobile GIS.** Introduction to open source software for GIS and their uses. introduction with freely available open source data.	**Unit V** **Advanced Sensor Technologies in Geospatial Sciences and Engineering**: Introduction to various sensors and IOT. Defining GEO-IOT, Integration of IOT with GIS, application of GEO-IOT, Drones application
6	**Paper V** **Practicals:** Lab 1. RISAT-1 data visualization Lab 2. Reading, displaying and header extraction of SAR images Lab 3. Visual Image Interpretation Lab 4. SAR Image fusion with Optical data Lab 5. Speckle Filtering Techniques	**Paper V** **Practicals:** Lab 1. RISAT-1 data visualization Lab 2. Reading, displaying and header extraction of SAR images Lab 3. Visual Image Interpretation Lab 4. Integrating sensor with GIS and drone data processing Lab 5. Speckle Filtering Techniques Lab 6. Hyperspectral data interpretation

	Lab 6. Hyperspectral data interpretation Lab 7. Spectral profile Lab 8. Hyperspectral Data cube	Lab 7. Spectral profile Lab 8. Hyperspectral Data cube

S.No	Existing document Paper VI (Advances in Geospatial Technology)	Proposed changes Paper VI (Advances in Geospatial Technology)
1	**Unit V:** **Application in Geo-Technical Engineering:** Digital Terrain Modelling, Geoinformatics in water harvesting site selection, Highways and Tunnel alignment studies **Application in Environmental Management**: Selection of disposal sites for industrial and municipal wastes, Solid waste management, Environmental Impact Assessment (EIA)	**Unit V** **APPLICATION IN ENVIRONMENTAL MANAGEMENT** Selection of disposal sites for industrial and municipal wastes, Solid waste management, Environmental Impact Assessment (EIA).
2	**Paper VI** **Practicals** Lab 1: Mapping flood hazards in a region using satellite images Lab 2: Urban sprawl mapping of a township using satellite images Lab 3: Crop forecasting using multi-dates satellite images Lab 4: Application of remote sensing for identification of waste disposal sites Lab 5: Forest cover and density mapping using geospatial techniques Lab 6: Mapping landslide hazards in a region using satellite images	**Practicals** Lab 1: Mapping flood hazards in a region using satellite images Lab 2: Urban sprawl mapping of a township using satellite images Lab 3: Application of remote sensing for identification of waste disposal sites Lab 4: Forest cover and density mapping using geospatial techniques Lab 5: Mapping landslide hazards in a region using satellite images

Paper VI (Applications of Remote Sensing) is to be considered as elective subject for the students for the upcoming batch of PGD-GIS 2019-2020.