UNIVERSITY OF LADAKH
Centre For Space Science and Allied Subjects

Curricular Components as per NEP 2020 Guidelines for PG Cources

For 2-year PG: Students entering 2-year PG after a 3-year UG programme can choose to do (i) *only course work in the third and fourth semester* or (ii) *course work in the third semester and research in the fourth semester* or (iii) *only research in the third and fourth semester*.

1-year PG: Students entering 1-year PG after a 4-year UG programme can choose to do (i) only coursework or (ii) research or (iii) coursework and research.

5-year Integrated Programme (UG+PG): At the PG level, the curricular component of 5-year integrated programme will be similar to that of 2-year PG mentioned above.

Programmes that are intended to sharpen the students' analytical abilities to optimally solve problems, the curriculum, in general, comprises advanced skills and real-world experience and less of a research component. Such programmes should have a curriculum that is different from other programmes.

Course Levels 400- Advanced courses which would include lecture courses with practicum, seminar based course, term papers, research methodology, advanced laboratory experiments/software training, research projects, hands-on-training, internship/apprenticeship projects *at the undergraduate level* **OR *First year Postgraduate theoretical and practical courses***.

Course Levels 500- For students who have graduated with a 4-year bachelor's degree. It provides an opportunity for original study or investigation in the major or field of specialization, on an individual and more autonomous basis at the postgraduate level

1. **Syllabus and Papers (Certificate):** *Course Levels 400*

Year 1 - Semester I (Exit- Certificate Course)					
Paper	Title	Units	Max Marks	Hours	Total Credits
CRS-101	Basics of Remote Sensing	Physics of Remote Sensing, History of Platforms, Sensors - Visual/ Microwave/ Thermal Sensors - LiDAR/ / Hyperspectral)	75	45	3
		Internal Assignment (Paper Writing)/Practical	25	30	1
CRS 102	Digital Image Processing	Image Processing and Enhancement, Image Classification, Image Fusion, Change Detection	75	45	3
		Internal Assignment (Paper Writing)/Practical	25	30	1
CRS 103	Geographical Information System	Introduction to Geographic Information Systems (GIS), Geospatial Database, Spatial Data Analysis, GPS & Geodesy	75	45	3
		Internal Assignment (Paper Writing)/Practical	25	30	1
CRS 104	Cartography	Introduction to Maps, Classification, Types and Scale; Projections - Types, Shape, Distance, Area, Directions; Map designing, Scanning, Digitization, Symbol & Signs	75	45	3
		Internal Assignment (Paper Writing)/Practical	25	30	1
CRS 105	Minor Dissertation		100	120	4

Output: Semester 1 Complete
Output: Certificate course in RS, GIS & Cartography

2. Syllabus and Papers (PG Diploma):

Year 1 - Semester II (Exit- PG Diploma)					
Paper	Title	Units	Max Marks	Hours	Total Credits
PGRS-1	Statistics & Software	1. Fundamental Statistical Concepts 2. Geo-statistics & Statistical applications in GIS 3. Excel & 'R' for Statistical Computing	75	45	3
		Internal Assignment (Paper Writing)/Practical	25	30	1
PGRS-2	GIS Software & Portal	1. QGIS & ArcGIS 2. Google Earth Engine & ERDAS Imagine 3. Bhuvan & EarthExplorer	75	45	3
		Internal Assignment (Paper Writing)/Practical	25	30	1
PGRS-3	Applications of Geoinformatics	Biodiversity and Natural Resource Management Environment and Water Resources Urban & Rural Planning	75	45	3
		Internal Assignment (Paper Writing)/Practical	25	30	1
PGRS-4	Major Dissertation	Case Study (*elective one theme specialization*) (Introduction, Literature Survey, Objective(s), Study Area, Methodology, Results, References = 100 pages)	200	300	10

Output: Year 1 (Semester 1 + Semester 2) Complete
Exit - PG Diploma in RS & GIS

UNIVERSITY OF LADAKH

3. Syllabus and Papers (Master): (Exit- MSc)

<table>
<tr><th colspan="6">Year 2 – Option A (Course work in the 3rd semester and Research in the 4th semester)</th></tr>
<tr><th colspan="6">Year 2 - Semester III</th></tr>
<tr><th>Paper</th><th>Title</th><th>Units</th><th>Max Marks</th><th>Hours</th><th>Total Credits</th></tr>
<tr><td rowspan="2">MSRS-301</td><td rowspan="2">Advances in Remote Sensing & GIS</td><td>Image Fusion, Machine Learning, Deep Learning, Artificial Intelligence</td><td>75</td><td>45</td><td>3</td></tr>
<tr><td>Internal Assignment (Paper Writing/Practical)</td><td>25</td><td>30</td><td>1</td></tr>
<tr><td rowspan="2">MSRS-302</td><td rowspan="2">Multi-disciplinary - Massive Open Online Courses (MOOCs)</td><td>Study Webs of Active Learning for Young Aspiring Minds (SWAYAM: www.swayam.gov.in)</td><td>50</td><td>15</td><td>2</td></tr>
<tr><td>IIRS EDUSAT Programme, START (ISRO) Programme OR any other Accredited Online Related Courses</td><td>50</td><td>15</td><td>2</td></tr>
<tr><td rowspan="2">MSRS-304</td><td rowspan="2">Skill Development Training- Field & Laboratory Practices</td><td>Field Work on Image classification/feature extraction/Spectral Signatures (Minimum 10 Days)</td><td>50</td><td>30</td><td>2</td></tr>
<tr><td>Laboratory Work on Field work translated to image analysis, data training for feature extraction, etc. (Minimum 60 hrs)</td><td>50</td><td>60</td><td>2</td></tr>
<tr><td rowspan="3">MSRS-304</td><td rowspan="3">Fundamental of Research</td><td>Research Methodology</td><td>50</td><td>30</td><td>2</td></tr>
<tr><td>Project Management (Hypothesis formulation, problem statement, Interpreting results, Report Writing, etc.)</td><td>25</td><td>15</td><td>1</td></tr>
<tr><td>Internal Assignment (Paper Writing)</td><td>25</td><td>30</td><td>1</td></tr>
<tr><td>MSRS-305</td><td>Minor Project</td><td>Dissertation (Introduction, Literature Survey, Objective(s), Study Area, Methodology, Results, References = 100 pages)</td><td>100</td><td>90</td><td>4</td></tr>
</table>

UNIVERSITY OF LADAKH

Year 2 – Option A (Course work in the 3rd semester and Research in the 4th semester				
Year 2 - Semester IV				
Paper	Title	Units	Max Marks	Total Credits
MSRS-401	Master Thesis in Application of Remote Sensing & GIS in any elective theme [Biodiversity/Water Resources/Environmental Monitoring/Urban Environment/ Natural Resource Management/ Rural Planning]	Synopsis of the Research (Introduction, Objective, Study Area, Methodology, Literature Survey = 20 Pages)	100	2
		Presentation & Viva Voice		
		MSc Thesis (Introduction, Literature Survey - International & National Status, Statement of Problem, Objective, Study Area, Methodology, Results, Discussion, References =100 pages) Evaluation by the External Examiner	400	18
		Presentation & Viva Voice		

Output: Year 2 (Semester 3 + Semester 4) Complete

Award - MSc in RS & GIS

UNIVERSITY OF LADAKH

Year 2 – Option C (only Research in Semester III & IV)					
Paper	Title	Units	Max Marks	Total Credits	
MSRS-403	Fundamental of Research	Research Methodology	50	2	
		Project Management (Hypothesis formulation, problem statement, Interpreting results, Report Writing, etc.)	50	2	
Research MSRS-404	Master Thesis in Application of Remote Sensing & GIS in any elective theme [Biodiversity/Water Resources/Environmental Monitoring/Urban Environment/ Natural Resource Management/ Rural Planning]	Synopsis of the Research (Introduction, Objective, Study Area, Methodology, Literature Survey)	25	1	
		Presentation & Viva Voice	25	1	
		MSc Thesis (Introduction, Literature Survey - International & National Status, Gap Area Statement of Problem, Objective, Study Area, Methodology, Results, Discussion, References = 200 pages) Evaluation by the External Examiner	300	32	
		Presentation & Viva Voice	50	2	

Output: Year 2 (Semester 3 + Semester 4) Complete

Award - MSc in RS & GIS