B. Fully facilitated GEOMATICS Lab at EWRE, UTD as Research Hub-1 through financial support of TEQIP-III and CSVTU Bhilai.

List of Software and Hardware available at Research Hub-1 (GEOMATICS Lab)

S. No.	Name of Software/ Equipment	Application
1.	ERDAS & GEOMEDIA	**Remote Sensing Image Interpretation and DIP Platform** Image analysis and Photogrammetry for optical panchromatic, multispectral and hyperspectral imagery, radar, and LiDAR data • Multi-core and distributed Image Processing • Spatial modelling with raster, vector and point cloud operators • High-performance terrain preparation and mosaicking • Image classification, Change Detection and feature extraction
2.	ARCGIS	**The Mapping and Analytics Platform for Geo-Spatial Data** To visualize spatial data, create thematic layered maps, and perform basic spatial analysis • Advanced tools for Data manipulation, editing, and analysis of shapefiles and geodatabases • 2D and 3D Platform for cartography and visualization, and include Artificial Intelligence • Spatial Analysis & Data Science, Field Operations, Mapping, Real-Time Visualization and Analytics, 3D GIS, Imagery & Remote Sensing and Data Collection & Management
3.	MIKE	**River Basin Management and Planning** • Multisector solution alternatives to water allocation and water shortage problems • Climate change impact assessments on water resources availability and quality • Exploration of conjunctive groundwater and surface water usage • Optimisation of reservoir and hydropower operations • Evaluation and improvement of irrigation scheme performance • Integrated water resources management (IWRM) studies • MIKE-Hydro Basin; SHE; Flood 1D 2D; Urban+, FEFLOW
4.	VISUAL MODFLOW Flex	**Groundwater Flow & Contaminant Transport Modelling Software** Delineate well capture zones for domestic water supply development • Design and optimize pumping well locations for mine dewatering projects • Determine contaminant fate and exposure pathways for risk assessment • Simulate surface water-groundwater interactions • Watershed scale/regional groundwater modelling • Evaluate groundwater remediation systems (pump and treat, funnel and gate etc) • Aquifer storage and recovery (ASR) • Evaluate saltwater intrusion
5.	Hydro Geo-Analyst	**Environmental Data Management, Analysis and Visualization Software** Manage data for local, state and federal groundwater monitoring networks • Manage data associated with remediation projects • Manage well construction details and registration information • Analyze borehole data acquired for mineral exploration • Interpret geologic and hydro-stratigraphic data • Mapping and reporting of aquifer extents and geologic formations • Store and report landfill monitoring data • Evaluate and report the spatial distribution of water quality parameters • Groundwater vulnerability assessment and protection planning

S. No.	Name of Software/ Equipment	Application
6.	**PCSWMM 2D**	**Hydrological Modelling at Urban Scale** Low Impact Development Design • Integrated Catchment/Watershed Modelling • Water Quality Modelling • Detention Pond Design • Dual Drainage System Design • Sanitary Sewer System Design • Storm water Management & Sewer Remediation • Flood Forecasting • Floodplain Mapping & Risk Analysis • Dynamic Storm Simulation
7.	**WaterGEMS**	**Water Distribution Analysis and Design Software** Analyse pipe and valve criticality • Assess fire flow capacity • Build and manage hydraulic models • Design water distribution systems • Develop flushing plans • Identify water loss • Manage energy use • Prioritize pipe renewal • Simulate networks in real time
8.	**PLAXIS**	**Stability Analysis of Dams, Dikes, And Levees** Complex Geotechnical Analysis • Limit equilibrium analysis • Finite element shear-strength reduction analysis • Seepage Effects Analysis • Stress/Deformation Analysis • Consolidation Analysis • Seismic Analysis • Static Liquefaction Analysis • Probabilistic Analysis
9.	**High End Workstations with computers**	**Geo-GPU: Qty. 1:** Processor AMD RyzenThreadripper 2990WX 32-Core, 3.00 GHz • GPU NVIDIA GeForceX-1070 Ti-8 GB GDDR5 • RAM 64GB with SSD Enabled **Z4 Desktop Workstation: Qty. 1:** Processor Intel® Core™ i9-7900X 10-Core, 3.30 GHz • GPU NVIDIA Quadro P2000 5GB GDDR5 • RAM 32GB with SSD Enabled **Precision Workstations: Qty. 4:** Processor Intel Core i7-8700K 6-Cores Processor, 3.70GHz • GPU NVIDIA GeForce GTX 1080 8GB GDDR5 • RAM 16GB **Computers: Qty. 8:** Processor Intel(R) Core (TM) i5-8500 6-Cores, 3.00GHz • Intel(R) UHD Graphics 630 • RAM 8GB
10.	**Geospatial Application Server**	**Geo-web Hosting Software** **Intergraph Geospatial Server (Web Server)** APOLLO Professional • GeoMedia Web Map Professional • Geospatial Portal • Geospatial SDI • GeoMedia Essential **GeoSpatial Application Server** Dual Xeon 16 Core Processor @ 3 GHz • 128 GB DDR-4 RAM • 2 TB SSD hard disk • NVIDIA RTX 2060 Super GPU • Dual 10 Gbps NIC • Windows Server 2016 **GeoStorage Manager with Fail-Safe mode** 1:1 - 174 Terabyte Storage capacity • Intel Xeon Quad Core Processor (2 separate systems) • LINUX based Storage Software with GUI • 10 Gbe Ethernet backbone • 5 KVA Online UPS with 1-hour battery backup

S. No.	Name of Software/ Equipment	Application
11.	**Unmanned Aerial Vehicle (UAV)**	**Advanced Surveying Equipment** Ultra-High-Resolution Hybrid VTOL PPK Mapping UAV • Area Coverage in one flight (60 min) ~1000 Hectares • H:V accuracy 5cm:15cm
12.	**DGPS**	**Advanced Surveying Equipment** To precise mapping of land • For optimum alignment in road construction • For detailed drawing of Water supply, sewerage and drainage system • Used to minimize 3-D positional variations and provide precise indexing of the photographic exposures. • for improvement in positional accuracy
13.	**Total Station**	**Advanced Surveying Equipment** To measure horizontal and vertical angles • To obtain the horizontal distance, inclined distance and vertical distance between ground points • To get the three-dimensional co-ordinates i.e.[x,y,z] of a point in space • To find the length of a missing the line • To find the elevation of the remote object • To locate the points at a predetermined distance along gridlines.
14.	**Water Current Meter**	**Cup Type Sensor & Pygmy Type** Used to measure velocity of water.
15.	**Water Table Sounder**	**Water Level Indicator- 100m.** To measure water level in open well, Surface water and bore wells.
16.	**Double Ring Infiltrometer**	**Double Ring Soil Infiltrometer** To determine the infiltration rate of water into the soil.
17.	**Laser Distance Meter**	**Laser Distance Meter** To determine the distance or non-approachable sites in a different unit.