

BOARD OF REVENUE, ODISHA, CUTTACK.
(L.R. & S. BRANCH)

Letter No. XXXVII-40/2019 2054/L.R.&S. Dt 10/04/2023

From:-

Additional Director, L R&S,
Board of Revenue, Odisha, Cuttack

To

The General Manager,
Central Tool Room & Training Centre, Bhubaneswar/
The Registrar,
Centurion University of Technology and Management, Bhubaneswar

Sub: Approval of institutions to conduct course for issue of certificate on advanced Cadastral & Digital Map Preparation.

Sir,

In inviting reference to the subject cited above, I am directed to say that, your Institutions have been approved for conducting six months course for issue of certificate on advanced Cadastral & Digital Map Preparation.

The open News paper advertisement will be issued by the institutions for selection of candidate for admission into the course following the transparent procedure. The six month course syllabus approved by D.L.R&S., Board of Revenue, Odisha, Cuttack (copy enclosed) shall be followed strictly. The course fee, License fee and all other terms and condition shall be followed as per Expression of Interest (copy enclosed).

You are therefore requested to take further necessary action in this regard.

Yours faithfully,

12/10/4/23

Additional Director, L R&S

Memo No.

2055

Dated

10/4/2023

Copy forwarded to the Additional Secretary to Government, Rev & DM Deptt., Odisha, Bhubaneswar/ Secretary, Board of Revenue, Odisha, Cuttack for information and necessary action.

12/10/4/23

Additional Director, L R&S

Memo No.

2056

Dated

10/4/2023

Copy to the Director, Technical Education and Training, Odisha, Cuttack/Additional Director, Survey & Map Publications, Odisha, Cuttack/Director, ROTI/Chief Executive, ORSAC, Bhubaneswar for information and necessary action.

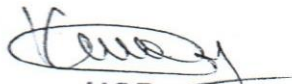
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Additional Director, L R&S

SYLLABUS

ADVANCED CADASTRAL SURVEY & DIGITAL MAP PREPARATION (Certificate Course)

Sl. No.	Code	Subject	Type (Theory + Practice + Project)
1		Basic Surveying	2+2+0
2		Cadastral Surveying and Land Laws	2+4+0
3		Hi-Tech Survey	2+4+0
4		Photogrammetry & Remote Sensing	2+2+0
5		Geographic Information System	2+2+0
6		Project	0+0+6
Total Credit			30


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SATYANARAYAN MISHRA
Senior Engineer Design

Basic Surveying

Code	Course Title	Credit	T-P-PJ
	Basic Surveying	2	2+2+0

Objective:

1. To study the temporary adjustment of survey instruments by standard methods levelling and cross sectioning survey and setting out works.
2. To do various field works with the help of Total station.
3. To Carry out topographic survey.

Learning outcome:

1. Carry out temporary adjustment of survey instruments by standard methods, levelling and cross sectioning survey and setting out works.
2. Carry out topographic survey.
3. Doing cantering, levelling & measuring coordinate points of area and calculation transfer to data from Total station to software spectrum link.
4. Doing field work using of simple machine parts such as Total -Station, Auto- level.

Course outline:

Module I

Introduction: Fundamentals of Surveying. Definitions of Surveying. Geodetic and Plane Surveying. Classification of Survey: Classification based on nature of the field, based on Purpose of the Survey, based on Instrument used, based upon scale.

Module II

Survey Equipment and field method: Different types of Chain, Compass, Plane Table, Theodolite, Level, EDM, Total Station, GPS/GNSS. Unit of measurement, Significant figures, Rounding off numbers.

Practice: Exposure to the different survey instruments. i.e., Chain, Plane Table, Theodolite, Total Station, Auto Level, Digital Level etc.



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Module III

Basic Mathematics for surveying and Theory of Errors: Geometry and mensuration, trigonometry, Co-ordinate and analytical geometry, direct and indirect measurements, mistakes, source of error in making observations. Errors in measurements, types of error, precision, and accuracy, eliminating mistakes, and systematic errors.

Module IV

Geometry of Ellipsoid: Everest and WGS 84, Latitude and Longitude, Co-ordinate, and **Map Projection:** Polyconic Projection, Lambert Conformal Conic Projection, Universal Transverse Mercator Projection, **Map scale:** Fractional or ratio scale, Linear Scale, Graphical Scale, Contour lines, Magnetic declination.

Practice: Calculate the scale of plans, Aerial Photographs, preparation of different thematic maps etc.

Module V

Basics of Map: Definition of Map, Classification of Maps: Physical Map, Topographic Map, Road Map, Political Map, Thematic Map, Open Series Map and Defense Series Map, Cadastral Map, Topo Sheet Numbering System, Map Reading: Direction (Compass points, Different bearings, and Azimuth, bearing and interpretation, Signs and Symbols.

Practice: visualize different maps, Download topographical maps (Open series map), Map Reading: Direction (Compass points, Different bearings, and Azimuth)

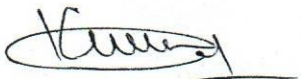
Reference Books:

1. Surveying & Levelling by T.P Kanitkar & V S Kulkarni

E Books:

1. Source of reference: NSQF

Online Source: NPTEL Videos (www.nptel.ac.in)



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Cadastral Surveying and Land Laws

Code	Course Title	Credit	T-P-PJ
	Cadastral Surveying and Land Laws	6	2+4+0

Objective:

1. The main task in the area of cadastral surveying is to collect data relating to plots of land and update the data as necessary.
2. This means it makes a valuable contribution towards the safeguarding of real estate.

Learning outcome:

1. The results of cadastral surveys are recorded in the plan for the land register.
2. To prepare different cadastral maps, surveying plots with Hitech instruments.

Course outline:

Module I: Fundamentals of Cadastral Survey:

Cadastral map preparation methodology, unique identification number of parcel, position of existing control points and its types, Adjacent boundaries and features, Topology Creation, and verification. Scale of Cadastral map, Equipment used in Cadastral Survey.

Practice: Control point marking on Cadastral Map for digitization. Georeferencing of Cadastral Map, digitization of cadastral map.

Module II: Theodolite Survey:

Different types of Theodolites (Transit and Non-Transit and Digital), Adjustment of Theodolite (Temporary and Permanent), Use of Theodolite, Theodolite Traversing, Azimuth and Bearing.

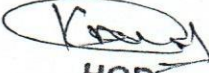
Practice: Theodolite or Total Station settings and angle measurement. Measurement of traverse angles and find out error in closed traverse.

Module III: Traversing:

Introduction, Closed and Open Traverse, Purpose of the traverse. Principles of the traverse. Methods of Theodolite Traverse, traverse computation (Bowditch's Method, Transit Rule, Graphical method for adjusting a traverse).

Practice: Observation of Traverse angle, Observation of Traverse Length. Selection of Traverse Station, Traverse Field Notes, Angle misclosure, Sources of error in traverse. Balancing angles,

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Computation of Azimuth or Bearing, Departure and Latitudes, Traverse adjustment, rectangular coordinates, Mistakes in traverse computation.

Module IV: Chain and Plane Table Surveying:

Introductions of chain survey, Principles of chain survey, technical terms of chain surveying, Procedure of chain survey, field problems and their solutions. Correction of Chain.

Principles of Plane Tabling Survey instrument used in plane tabling survey, working operations, different methods of plane tabling survey: Radiation Method, Intersection method, traversing method, Resection Method, Mechanical (tracing paper) method, Graphical method, trial and error method, Lehmann's rules, Two-point problem. Advantages and Dis advantages of Plane Tabling, Errors in Plane Tabling. **Demarcation:** Demarcation of individual plots, Village Boundary, reestablishment of pillars etc.

Practice: Cadastral Survey by using Chain and Plane table, Demarcation of plot on the ground by using chain.

Module V: Survey & Settlement Act

Survey and Settlement Act and rules 2012, Understanding SOP with Special emphasis on filling of Appendix - 7, recent act and rules frame by Govt. time to time.

Practice: fill up different forms

Referred Books

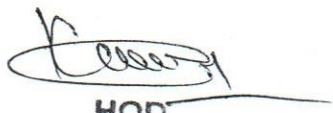
1. Land Tenure, Boundary Surveys, and Cadastral Systems Hardcover by George M. Cole, Donald A. Wilson, 1st edition, CRC Press; ISBN-13 : 978-1498731652.
2. Cadastral Photogrammetry: The Indian Situation (GIS Articles Book 16), by GS Kumar, GeoMap Society publisher.

Hi-Tech Survey

Code	Course Title	Credit	T-P-PJ
	Hi-Tech Survey	6	2+4+0


Objective:

1. To study the temporary adjustment of survey instruments by standard methods
2. To Carry out the topographic surveys using Hi-Tech surveying instruments
3. To provide basics of digital surveying and mapping of earth surface using GPS, DGPS & ETS.



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Learning outcome:

1. Fieldwork using Hi-Tech surveying instruments
2. Preparation & digitization of different topography maps with the help of GIS software
3. Generation of map & reports.

Contents:

Module I: GPS/GNSS:

Introduction, GPS Segments: Space Segment, Control Segment and user Segment, Satellite ranging, Positioning Services (SPS, PPS), Errors of GPS/GNSS: Ephemeris error, Clock Stability, Ionospheric Delays, Troposphere Delay, Signal Multipath, Satellite and Receiver Clock error, Selective availability, Anti-Spoofing, Receiver Noise, Data format: RINEX etc, GPS Augmentation.

Practice: Setting the instrument and know the different functions of the GPS/GNSS. Setting of Base station of DGPS, DGPS survey observation, down loading of data, processing by its related software.

Module II: DGNSS & RTK

Introduction, Base Station Setup, Rover GPS Setup, GNSS observation, Download of data, processing of co-ordinates.

Practice: Setting of GPS/GNSS instruments, Observation, downloading observed data and processing in by its related software. Provide control points for cadastral survey by Photogrammetry and ground hi-tech survey. Network adjustment of Control points for better accuracy.

Module III: Electronics Total Station (ETS)

Characteristics of Total Station, Functions performed by ETS, Parts of ETS, Servo-Driven and Remotely operated ETS, Error and accuracy of Total Station, Advantages and disadvantages of Total Station.

Practice: Handling and setting up a ETS, Distance measurement and angle measurement by ETS, Remote Distance and Elevation Measurement (REM and RDM), Traverse by Total Station, details survey by total station, Downloading of Total Station data and draw on AutoCAD and GIS software, Demarcation by ETS.

Module IV: Levelling

Introduction, Definitions, Mean Sea Level as Standard Datum, Methods of Levelling: Spirit Levelling, Barometric Levelling, Trigonometric Levelling, Classification of Levelling, Instrument for Spirit Levelling, Adjustment of Levelling, Errors in Levelling, Mistakes, reducing errors and eliminating mistakes, Curvature and refraction.



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Practice: Know the existing BMs on the ground, Setting of Auto Level and Digital Level, leveling by different methods i.e. Rise and fall method etc. Closed levelling and error distribution.

Referred Book:

SATHEESH GOPI, R. SATHIKUMAR, N. MADHU ADVANCED SURVEYING (Total Station, GPS, GIS and Remote Sensing), 2nd Edition, ISBN: 9789352860722

Photogrammetry & Remote Sensing

Code	Course Title	Credit	T-P-PJ
	Photogrammetry & Remote Sensing	4	2+2+0

Objective:

1. Apply the principles of Remote Sensing and GIS to collect, map and retrieve spatial information.
2. Use geospatial tools and techniques for natural resources planning and management.
3. Pursue research and develop capabilities to handle multi-disciplinary field projects.
4. Work in teams and demonstrate leadership skills with professional ethics.

Learning outcome:

1. Identify specific data and methodologies for effective mapping and evaluation of natural resources.
2. Design multi-criteria geospatial systems for decision-making process
3. Work in a team using geospatial tools and environment to achieve project objectives.
4. Pursue lifelong learning for professional advancement.

Contents:

Module: I: Fundamentals of Photogrammetry

Historical Evaluation of photogrammetry, Basic Definitions of Photogrammetry, Aerial cameras, Types of aerial photographs, Scale of a vertical photograph, Geometry of vertical aerial photography, Relief displacement on a vertical photograph, Flying height, Stereoscopic parallax, Stereoscopic viewing, Stereoscopic plotting instruments, Orthophoto, Ground control for photogrammetry, Merits and demerits of Photogrammetry.



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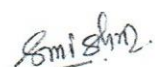
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Practice: Calculate the scale of aerial photograph by different method, use of pocket stereo scope and mirror stereoscope. Interpretation of features by visualizing the aerial photograph.

Module: II: Digital Photogrammetry

Acquisition of imagery using aerial and satellite platform, Control survey, Geometry distortion in imagery, Application of imagery and its support data, Aerial Triangulation, Digital Elevation Model (DEM), Ortho photo Generation, 3D Visualization, Detail extraction.

Practice: Planning to provide control points, Visit some Survey of India Triangulation points and Bench Marks on the ground.

Module: III: Fundamentals of RS

Concept of Remote Sensing, Principles of Remote Sensing, Components of Remote Sensing, Characteristics of Electromagnetic Radiation, Electromagnetic Spectrum, Platform, Types of Remote sensing, Active and Passive Remote sensing, Resolutions of Satellite Image.

Practice: Downloading of imageries from USGS and Bhuvan. Exposure to high resolution satellites.

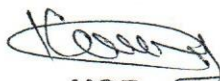
Module: IV: Digital Image Processing

Preprocessing, Image enhancement, Image Transformation, Image Classification, Remote Sensing in India, Data from IRS Satellite, Landsat Image download and High Resolution Satellite Imagery and LiDAR: Land observation satellites; characters and applications, PSLV, GSLV, LANDSAT series; IRS series: IKONOS Series; QUICKBIRD series; World View image; Weather/Meteorological satellites; INSAT series; NOAA, Applications: Marine observation satellites, OCEANSAT.

Practice: Layer stacking, creation of FCCs, Digital Image Interpretation, Subset, LUT, Classification.

Referred Books:

1. Anji Reddy .M, "Textbook of Remote Sensing and Geographical Information Systems", BS Publications, Hyderabad, 2011. ISBN: 81-7800-112-8.
2. Chandra .A.M and Gosh .S.K, "Remote Sensing and GIS", Narosa Publishing Home, New Delhi 2009.
3. Thomas M. Lilles and, Ralph W. Kiefer, Jonathan W. Chipman, "Remote Sensing and Image Interpretation", John Wiley & Sons, 2008.
4. George Joseph, "Fundamentals of Remote Sensing" . Universities Press. Hyderabad 2005.



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Geographic Information System

Code	Course Title	Credit	T-P-PJ
	Geographic Information System	4	2+2+0

Objective:

1. To study the basic concepts of GIS.
2. To study the data structure in GIS
3. To study data conversion in GIS and Meta data
4. To know the basics, importance, and methods of Cartography
5. To study the various maps projection and co-ordinate systems.

Learning outcome:

At the end of this course the students will be able to:

1. To understand the structure of spatial data including file associations, attribute tables, Metadata, coordinate systems, and projections.
2. To develop software skills in programs used for map production in the modern cartographic workflow.
3. To learn the fundamental concepts of Cartography and its advancements as Digital Cartography.
4. The engineers will be enabling to different aspects of Map Making, Generalization, Map Production and Map Reproduction.

Module I: Introduction

Components of GIS, History, Geospatial data architecture, Operations, Geographic co-ordinate systems, Map projections, concepts, input data for GIS, display, types of output products, GIS categories, Level and scale of Measurement, importance of data quality.

Practice: Downloading of QGIS software and installation. Downloading of Survey of India Toposheet. Georeferencing of Topo map in ArcGIS and QGIS. Creation of feature class, Digitization of Point, Line and Polygon.

Module II: VECTOR DATA & PROCESSING

GIS data types, data Representation, Data sources, typical GIS data sets, Data Acquisition, vector data model, topology, topology rules, Non topological vector data, object based vector data model.



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relationship between classes, data structure, data verification and editing spatial data models and errors – GIS database, attribute data input and management.

Practice: Digitization of features from satellite images, Attribute data entry.

Module III: RASTER DATA AND PROCESSING

Raster data - elements of data model, cell, value, data structure, cell by cell encoding, run length encoding, Quad tree, Header files format, Types of raster data, data compression, Linking and integration of vector data, Registration.

Practice: Raster and Vector analysis: feature classes to KML conversion.

Module IV: DATA CONVERSION AND EDITING

Data format conversion, Medium conversion, Spatial interpolation, measurement and analysis methods, Data accuracy and standards, Attribute data input and Management- Relational mode- Data manipulation, classification techniques.

Practical: Export and Import of Feature classes, DEM creation, contour generation from DEM


Module V: META DATA AND GIS MODELLING


Meta data – data standard- OGC- open source GIS - GIS modelling, basic elements, classification, model processing, integration, Binary models, index model, regression models, linear regression model, logistic regression model, process model.

Practice: Symbolisation of features, Layout of map with scale

E Books

1. Menno Jan Kraak and Ferjan Ormeling 2010. Cartography: Visualization of Spatial data, Third Edition, Pearson Education limited, ISBN: 978-0-273-72279-3.
2. Burrough P.A., Principles of Geographical Information System for Land Resources Assessment, Oxford Publications, 1980.
3. A.M. Chandra and S.K. Ghosh 2000. Remote Sensing and GIS, Narosa Publishing House, New Delhi.
4. Paul A. Longley, Micheal F. Goodchild, David J. Magaine David J. Magaine, David W Rhind, Geographical Information System, Vol. I & II, John wiley & Sons, Inc., 1999.
5. Kang-tsung Chang, Introduction to Geographical Information System, Fourth Edition, Tata McGraw Hill, 2008.
6. Anji Reddy .M. "Textbook of Remote Sensing and Geographical Information Systems", BS Publications, Hyderabad, 2011, ISBN: 81-7800-112-8


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Code	Course Title	Credit	T-P-PJ
	Project	6	0+0+6

Preparation of Cadastral map by field survey method.

- a. Preparation of Cadastral map from photogrammetry method.
- b. Preparation of Cadastral map from High resolution satellite imagery.
- c. Combination all the above method and comparison with old cadastral map
- d. Drone data capturing and interpretation.

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PART-I: GENERAL TERMS

GOALS OF THIS EXPRESSION OF INTEREST (EOI)

The objective of this EOI is to solicit proposals from the interested Government and Private Educational Institutions for participation in the process of shortlisting of such institutions to offer *certificate course* on "Advanced Cadastral Survey & Digital Map Preparation" Course as part of a holistic 'Credit, Competence and Outcome Based Formal Learning' in consonance with the standards of the National Skill Qualification Framework (NSQF). The course duration is *Six months* and the students may exit after six months with a Certificate (NSQF Level 4). Those are having such certificate will be eligible to apply to DLR&S for licence U/S-15 of the O.S.S. & S. Act, 2012 and read with Rule-18 O.S.S & S Rules, 2012.

EOI ISSUING AUTHORITY

This Expression of Interest (EOI) is issued by the Director Land Records and Surveys (DLR&S), Odisha, intending to short-list potential Government and Private Educational Institutions. Decision of Director Land Records and Surveys (DLR&S), Odisha, with regard to the short-listing of the Institutes/Universities through this EOI shall be final and the DLR&S, Odisha reserves the right to reject any or all the bids without assigning any reason.

AVAILABILITY OF THE EOI DOCUMENTS

EOI can be downloaded from the Board of Revenue website (<http://boardodisha.nic.in/>). The Institutes / Universities are expected to examine all instructions, forms, terms and conditions, course requirements and other details in the EOI documents. Failure to furnish complete information as mentioned in the EOI documents or submission of a proposal not substantially responsive to the EOI documents in every respect will be at the risk of the Institutes / Universities and may result in rejection of the proposal.

GOVERNMENT / PRIVATE EDUCATIONAL INSTITUTIONS' CONFERENCE

DLR&S, Odisha, will host a Conference in Cuttack, at the address given below with contact details. The Conference is tentatively scheduled as per the schedule given. The representatives of the interested organizations (restricted to two persons) may attend the conference at their own cost. The purpose of the said conference is to provide Institutes/Universities with any clarifications regarding the EOI. It will also

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provide each Institute/University with an opportunity to seek clarifications regarding any aspect of the Eol and the project. The venue for the conference will be at the address given.

VENUE & DEADLINE FOR SUBMISSION OF PROPOSALS

Proposals must be submitted to DLR&S, Odisha, at the address mentioned in the Eol. DLR&S, Odisha may extend the deadline for submitting proposals in exceptional circumstances by issuing an addendum to be made available on the Board of Revenue, Odisha website, in which case all rights and obligations of DLR&S, Odisha and the Government/Private Educational Institutions previously will be subjected to the deadline as extended.

EOI PROCESSING FEES

A non-refundable processing fee of Rs. 10,000 (Rupees Ten thousand only) in the form of a Demand draft or a Pay Order drawn in favour of **Director, Land Records & Surveys**, has to be submitted along with the Eol Response. Govt. Institutions/Universities are exempted from payment of Processing Fees. Eol received without or with inadequate Processing fees as applicable shall be liable to get rejected.

PART II: SCOPE OF SERVICES

BACKGROUND

The creation of a human resource pool of surveyors is pivotal for land administration. It is required to generate a pool of skilled surveyor human resource for Land survey and maintenance of a revenue record database along with the transition from plane table survey to digital map preparation through Hi-tech survey. It is intended not only to change in survey techniques but also it is a holistic approach to encompass both plane table and Hi-tech survey cognitive skills for any surveyor. It is an outcome based approach as per National Skills Qualification Framework (NSQF).

DETAILS OF THE CERTIFICATE COURSES on "Advanced Cadastral Survey & Digital Map Preparation"

The "Advanced Cadastral Survey & Digital Map Preparation" Course has a scope in the curriculum to undertake Survey and Settlement Operations in the State by adopting modern technology to minimize the time span without compromising quality. It will also help for Mining survey, Natural Resource Management, Construction of Highways, Bridges, Pipe lines and other Major engineering projects etc.

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Consequent upon enactment of the Odisha Special Survey & Settlement Act, (2012) licensing and engagement of Licensed Surveyors was mandated for Survey, Map Preparation, and Verification work using modern technologies viz. use of Differential GPS, Electronic Total Stations, Photogrammetry and GIS Software based map preparation including Digital Elevation Models. Hence creation of a human resource pool of Licensed Surveyors becomes indispensable for the purpose. It further necessitates devising of a holistic training curriculum for a 'Credit, Competence and Outcome Based Formal Learning' in consonance with the standards of the National Skill Qualification Framework (NSQF).

The Revenue Officers' Training Institute (R.O.T.I), Bhubaneswar, is the only Government Institution offering Training Courses for **Licensed Surveyors**. However, the participation of other potential Government and Private Educational Institutions shall add not only professional orientation to the module of training but also popularise the specific skill of Advanced Cadastral & Digital Survey & Map Preparation as a career option. The above course being offered as a Certificate Course shall be treated as a Formal Course conducted by University/Certificate Awarding Body.

OBJECTIVES OF THE EXPRESSION OF INTEREST

The objective of the Eoi shall be to create highly skilled professional Licensed Surveyors through a formal training curriculum for a 'Credit, Competence and Outcome Based Formal Learning' offered by Government and Private Educational Institutions.

Short listing Procedure

Each Government/Private Educational Institution shall participate in the following stages to get shortlisted:

- Stage I: Pre-Qualification
- Stage II: Proof of Concept

Each shortlisted Government/Private Educational Institution, based on the pre-qualification criteria shall mandatorily participate in Proof of Concept (PoC) demonstration which forms an integral part of the Eoi process.

- Pre-Qualification—All Government/Private Educational Institutions responding to this EOI would need to meet the pre-qualification criteria as prescribed to get qualified. *Only those satisfy the Pre-Qualification Criteria shall be eligible to participate in Proof of Concept Demonstration.*

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- Demonstration of Proof of Concept (PoC) – The Institutions *successfully qualified the Prequalification criteria* would be required to demonstrate a PoC as per the criteria of this EoI which describes the Test Training Sessions/Presentations for PoC evaluation.
- Technical Evaluation Committee appointed by DLR&S, Odisha shall evaluate the PoC demonstration by participating Government / Private Educational Institutions based on the Test Training Sessions/Presentations.
- The list of Institutions who are selected by the Technical Evaluation committee shall form the list of Shortlisted Institutions only after due approval by Member Board of Revenue. The principle of selection shall be approved by Member Board of Revenue.
- The shortlisted Institutions shall have to enter into Memorandum of Agreement (MOA) with DLR&S to be entitled to start the course.
- The MOA shall be valid initially for 5 years and which can be renewed on term basis of 5 years at a time on successful performance. For this purpose the Institute has to apply for renewal to DLR&S.

PRE-QUALIFICATION CRITERIA

As part of eligibility criteria, only those Government/Private Educational Institutions who meet the following pre-qualification criteria are eligible to participate in the shortlisting process. Such Govt./Private Institutions must be offering Diploma/Degree course in Civil Engineering duly approved by AICTE/UGC. The Government/Private Educational Institutions must be a single entity and no consortium is allowed. Government/Private Educational Institutions failing to meet these criteria or not submitting requisite supporting documents/documentary evidence for supporting prequalification criteria are liable to be rejected summarily.

The pre-qualification shall include technical and logistic competence of the Institutions to offer the course. This shall mandatorily require the following minimum standardisation.

- I. Maximum 4 No. of Trainees for each set of DGPS & ETS Machine Set with a minimum of 6 sets to take up a batch of 24.
- II. Minimum one Plane Table and required instruments for 6 Trainees with a minimum of 4 Sets for a batch of 24.

- III. Photogrammetry software's with accessories.
- IV. GIS software with required system.
- V. Desk Top Computers (core i5 or higher processor)-25 No.

1. **Number of years in the similar experience:** The intending Institution should have at least five years of experience of Teaching Civil Engineering of Diploma/Degree in Civil Engineering/Survey course of NCVT. Documents need to be submitted to the effect of approval/affiliation from regulatory body and students passing result.
2. **Number of years of incorporation:** Document need to be submitted UGC/AICTE like approval, Certificate of capacity and capabilities of Ministry of Skill Development and Entrepreneurship or National Skill Development Agency.

PRE-QUALIFICATION CRITERIA REQUIRED DOCUMENTS

A. Training Logistics with numbers available

- 1) Differential G.P.S. / GNSS
- 2) E.T.S.
- 3) Level (Auto-level, Digital Level)
- 4) Plane Table with accessories
- 5) Plane Survey Instruments
- 6) Desk Top Computers (core i5 or higher processor)
- 7) Software

Trainers Skill set mandated:

The Trainer of Skill components must be minimum B. Tech in Civil Engineering. The trainer experience should be at least five years in teaching on Civil Engineering survey. Faculty with Diploma in Civil Engineering with Land surveyor Certificate from ROTI with minimum 2 years experience in field of surveying should also be considered as Trainer. There should at least 3 Trainers in the Institute with above qualification and experience to offer the above course. Documents like resume of the trainers and relevant educational certificates need to be submitted. Skills like;

- 1) Cadastral Surveying and Kishtwar (use of instruments)
- 2) Shape, Alignment of Plots and Map Preparation
- 3) Calculation of Area

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- 4) Calculation of Rent
- 5) Establishment of Land Titles
- 6) Verification of Titles and Maps during Survey & Settlement Operations.
- 7) Establishment and Monument action of Base Stations and Control Points.
- 8) Use of DGPS/DGNSS, ETS, Level Machines etc.
- 9) Imagery and Photogrammetry
- 10) Ortho-Imaging and Geo-Referencing
- 11) Software skills: CAD, Image processing and GIS

(Member, Board of Revenue may add any further condition including conditions or Level Descriptors of NSQF)

PROOF OF CONCEPT

Each shortlisted Government/Private Educational Institution, based on the Pre-qualification criteria shall have to mandatorily participate in the Proof of Concept (PoC) demonstration. PoC demonstration shall be examined by the Technical Evaluation Committee, appointed by DLR&S, Odisha, on the basis of Test Training Sessions/Presentations.

Government/Private Educational Institutions shall have to successfully demonstrate a minimum of 6 test cases from the list of test cases as a pre-requisite condition for short listing Results and output from PoC demonstration shall form as inputs and used while finalisation of the Training Design Document (TDD). DLR&S, Odisha reserves the right of updating / changing / modifying the test cases even during the PoC demonstration phase and may also review the condition for successful demonstration of Test Training Sessions/Presentations as a prerequisite for shortlisting, if such a need is felt by the Technical Evaluation Committee. It is important to note that the decision of DLR&S, Odisha shall be final and binding in this regard to all the participating Government/ Private Educational Institutions. Every Government / Private Educational Institutions shall submit a detailed approach & methodology along with training plan.

Guidelines for curricular aspects, assessment criteria and credit system

This "Advanced Cadastral Survey& Digital Map Preparation" Certificate course must follow the UGC guidelines for curricular aspects, assessment criteria and

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credit system in Skill based vocational courses under National Skill qualification Framework (NSQF).

PROGRAMMES AND CURRICULA

In order to make education relevant and to create 'industry fit' skilled workforce, the Government/Private institutions must recognized under NAAC Gradation/Certificate of capacity and capabilities of Skill Universities, institute from Ministry of Skill Development and Entrepreneurship, National Skill Development Agency to offering skill based courses will have to be in constant dialogue with the industry and respective Sector Skill Council(s) so that they remain updated on the requirements of the workforce for the local economy. The institutions should adopt and integrate the guidelines and recommendations of the respective Sector Skill Councils (SSCs) for the assessment and evaluation of the vocational component, wherever available.

2. There will be credit-based modular programmes, wherein banking of credits for skill and general education components shall be permitted so as to enable multiple exit and entry. Duration of the course is Six months (180 Days) and total credit is 30 credits under NSQF level 4. The Skill Component shall be of 18 credits and the General Component shall be of 12 credits. The syllabus of both skill and general components shall be prepared by DLR&S and vetted by Govt.

3. The general education and skill component will be assessed at the concerned institutions following the guidelines specified in the syllabus and as per the norms for University/Certificate Awarding Body. The following formula may be used for the credit calculation in general education component of the courses:

- General Education credit refers to a unit by which the course work is measured. It determines the number of hours of instructions required per week. One credit is equivalent to one hour of teaching (lecture or tutorial) or two hours of practical work/field work per week. Accordingly, one Credit would mean equivalent of 14-15 periods of 60 minutes each or 28 – 30 hrs of workshops/labs.
- For internship/field work, the credit weightage for equivalent hours shall be 50% of that for lectures/tutorials.

Entry Qualification:

The entry qualification for students joining the above course is pass in 10+2 in any stream with Mathematics as a subject in 10th level.

Award of Certificate:

The award of 'Certificate' to the successful learners in both skills and general education components of the curriculum shall be done by respective University/Certificate Awarding Body

Fees :

Qualified/shortlisted candidates will pay the course fee of Rs.60,000/- (Rupees Sixty thousands) only per participant and GST shall be charged extra. 50% payment will be made as advance and rest 50% shall be after completion of Course. Lodging and Boarding charges shall be charged Rs.1200/- per participants per day which is optional.

Syllabus: The broad syllabus contents shall be approved by DLRS in consultation with ORSAC which shall be circulated to the Universities/Certificate Awarding Bodies to implement. The concerned University/ Certificate Awarding Body shall take steps to approve the syllabus at their level following their formalities for implementation. Certification shall be done by respective University/Certificate Awarding Body.

License:

Interested Certificate holders of the above course may apply for License to DLR&S to be Licensed Surveyor. DLR&S shall issue License to successful candidates who qualify the Examination conducted by DLR&S separately, preferably twice in a year or as decided by Govt.

Batch Size:

The batch size shall be 24. Number of Batches can be offered in any Institute is maximum 2 per year.

Candidate Selection Authority:

The shortlisted Institute shall select the candidates for admission into the above course following transparent procedure. They have to admit students through open advertisement in News papers.

PART III: TERMS OF REFERENCE

TERMS OF REFERENCE FOR THE SHORTLISTING CONTRACT

General Conditions

All Training Courses shall be in physical mode as per the course curriculum approved by DLR&S, Odisha in consultation with ORSAC, Bhubaneswar. Assessment and Certification shall be done by respective Universities/Certificate Awarding Body. The Licence to the qualified and certified candidates shall be issued by the DLR&S, Odisha through a separate qualifying examination conducted by DLRS.

Participation in courses on Advanced Cadastral Survey & Digital Map Preparation

All the shortlisted Government/Private Educational Institutions are eligible to offer course on Advanced Cadastral Survey & Digital Map Preparation. However, DLR&S, Odisha reserves the right of altering/changing this condition and the decision of DLR&S, Odisha in this case shall be final.

Validity of EOI

Eoi on Course offers submitted by the Government/Private Educational Institutions shall remain valid for a period of 180 (one hundred and eighty) days after the date of shortlisting. DLR&S, Odisha may solicit the consent of the shortlisted Government/Private Educational Institution to an extension of validity beyond the mentioned time period but without the modification in the proposal of Eoi.

Clarifications to Eoi

During Eoi evaluation, DLR&S, Odisha may, at its discretion, ask participating Government/Private Educational Institutions for clarifications on their Eoi. The Government/Private Educational Institutions are required to respond within the time frame prescribed by Board of Revenue/DLR&S, Odisha during release of clarifications.

Amendments in Eoi

At any time prior to deadline for submission of Eoi, DLR&S, Odisha may for any reason, modify the Eoi. The participating Government/Private Educational Institutions having received the Eoi shall be notified the amendments through website and such amendments shall be binding on them.

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Disqualification

DLR&S, Odisha may at its sole discretion and at any time during the evaluation of Eol, disqualify any participating Government/Private Educational Institution, if the participating Government/Private Educational Institution has:

- i. Submitted the Eol documents after the response deadline;
- ii. Made misleading or false representations in the forms, statements and attachments submitted in proof of the pre-qualification requirements;
- iii. Exhibited a record of poor performance such as abandoning works, not properly completing the contractual obligations in any project in the preceding three years.
- iv. Submitted an Eol that is not accompanied by required documentation or is non-responsive;
- v. Failed to provide clarifications related thereto, when sought; for
- vi. Submitted more than one Eol;
- vii. Declared ineligible by the Government of India/State/UT for corrupt and fraudulent practices or blacklisted.

Confidentiality

Information relating to the examination, clarifications and comparison of the Eol shall not be disclosed to any participating Government/Private Educational Institution or any other persons not officially concerned with such process until the shortlisting process is over. The undue use by any participating Government/Private Educational Institution of confidential information related to the process may result in rejection of their Eol.

Force Majeure

No failure or delay or omission by either party to fulfil any of its obligations under shortlisting/empanelment contract (other than the obligations to make payments when due) shall give rise to any claim against such party or be declared to be a breach of any terms and conditions defined in the shortlisting/empanelment contract if any to the extent such failure, delay or omission arises from the "Force Majeure" event not within the reasonable control and at the instance of such Party (each an event of "Force Majeure").

Events of force Majeure shall be:

- i. Blockade, Revolution, Riot, Bombs, Religious strife or Civil Commotion;
- ii. Strikes, lock-outs or other industrial action (other than those involving primarily Government/Private Educational Institution own employees or any of the contractors, sub-contractors, etc. directly associated with the provision of Services under this EoI).
- iii. Act of war (whether declared or undeclared), terrorist or military action, politically motivated sabotage;
- iv. A decision or the order of a Court or Tribunal, which has the effect of restraining or delaying the training courses;
- v. Explosions, accident, breakage of facilities, plant or equipment, structural collapse, fire chemical or radioactive contamination (other than resulting from an act of war, terrorism or sabotage), caused by a person not being the affected Party i.e. the Government/Private Educational Institution or one of its contractors or sub-contractors, sub-lessees or any other agencies of the affected Party or any of their respective employees, and not being due to inherent defects of the affected facility or the failure to properly operate the affected facility;
- vi. Fire, lightning, earthquake, cyclone, hurricane, whirlwind, flood, landslide or any such natural disaster;
- vii. Epidemic or Plague;
- viii. Any event or circumstance of the nature analogous to any of the above or any natural disaster

Non-Waiver

Waiver of any breach of the provision of, or any default under the shortlisting/empanelment contract must be in writing and signed by the Party granting the waiver. No failure or delay on the part of either Party in exercising or any omission to exercise any right or remedy accusing to either Party under the empanelment contract shall be a waiver thereof, nor will any partial exercise of any right or remedy particular be a waiver of further exercise of that right or remedy.

Amendment

Terms and conditions as defined in the shortlisting/empanelment contract shall not be modified, added to or amended in any manner except by mutual

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agreements in writing of the Parties. All modifications, additions or amendments under the shortlisting/empanelment contract must be in writing and signed by an authorized representative of the Parties here to be effective and enforceable between the Parties.

Arbitration

All disputes, differences, claims and demands arising under the empanelment contract shall be referred to arbitration of a sole arbitrator to be appointed by the mutual consent. All arbitration shall be held in Cuttack/Bhubaneswar, Odisha.

If the parties cannot agree on the appointment of the Arbitrator within a period of one month from the notification by one party to the other of existence of such dispute, then the Arbitrator shall be nominated by the Law Department, Government of Odisha. The provisions of the Arbitration and Conciliation Act, 1996 shall be applicable and the award made there under shall be final and binding up on the parties hereto, subject to legal remedies available under the law. Such differences shall be deemed to be a submission to arbitration under the Indian Arbitration and Conciliation Act, 1996, or of any modifications, Rules or re-enactments thereof.

Governing Laws

Empanelment contract shall be covered and construed in accordance with Laws of India including without limitation, the relevant Central and State Acts and Rules, Regulations and Notifications issued and amended there under from time to time. Courts at Cuttack/Bhubaneswar shall only have the jurisdiction in case of litigation between the parties.

Schedules:

Sl. No.	Activity	Last Date
1	Conference at Office of DLRS, Cuttack	
2	Submission of EOI with Fees as applicable	
2	Evaluation of Prequalification	
3	POC Demonstration & Presentation	To be intimated to the qualified Institutes

Address of DLRS:

Director of Land Records & Survey
Board of Revenue,
Rajaswa Bhawan, Near High Court of Orissa

Cuttack-753002

Proforma of Application

1. Name of the Institution
2. Year Established
3. Address of Registered office
4. Address of Head Quarter
5. Telephone No (Office)
6. Email Address (Office)
7. Website
8. Name of the Principal/Director/Head of Institution
9. Mobile Number of Principal
10. PAN No of Institution
11. No. of years of proven experience of providing Teaching in Degree/Diploma in Engineering level of Civil engineering/Survey of NCVT with supporting documents
12. Quality Certification (NAAC/NBA)
13. Approval from Regulatory Body (UGC/AICTE) of current year
14. Type of Institution (University/Autonomous Institution /Affiliated Institution)
15. University/ Certificate Awarding Body to which Affiliated
16. No of Teachers/Trainers (as per scope of EOI) currently under employment
17. No. of Differential G.P.S. / GNSS available
18. No. of ETS available
19. No. of Level (Auto-level, Digital Level) available
20. No. of Plane Table with Accessories available
21. No. of Plane Survey Instruments available
22. Photogrammetry software's available
23. GIS software available
24. AUTOCAD software available
25. No. of Computers (working) available
26. No. of Books on Survey available in Library
27. No. of Hostel seats to be made available for the new course on Survey
28. No. of Free Class Rooms available for the course

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NB:

1. Supporting Documents towards availability of the equipments to be furnished along with copy of pages of stock registers with entries of such equipments and Photographs of Labs and equipments to be furnished.
2. List of Teachers/trainers with their credential documents need to be submitted.
3. Proposed Teaching and Training work Plan and Methodology for the survey course to be submitted

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