

PROPOSED

6TH SEMESTER

CURRICULAR STRUCTURE

AND

SYLLABI OF

FULL-TIME DIPLOMA COURSE IN

SURVEY ENGINEERING

**PROPOSED CURRICULAR STRUCTURE FOR SIXTH SEMESTER OF THE FULL TIME
DIPLOMA COURSE IN SURVEY ENGINEERING**

WEST BENGAL STATE COUNCIL OF TECHNICAL EDUCATION												
TEACHING & EXAMINATION SCHEME FOR DIPLOMA IN ENGINEERING COURSES												
BRANCH: DIPLOMA IN SURVEY ENGINEERING										SEMESTER: SIXTH		
SL. NO.	SUBJECT	CREDITS	PERIODS			EVALUATION SCHEME						
			L	TU	PR	INTERNAL SCHEME			ESE	PR #	TW @	TOTAL MARKS
						TA	CT	TOTAL				
1	Industrial Management	3	4	-	-	10	20	30	70	-	-	100
2	Environmental Engineering	4	4	1	-	10	20	30	70	-	-	100
3	Photogrammetry and Remote Sensing	3	4	-	-	10	20	30	70	-	-	100
4	Elective (any one)	3	3	1	-	10	20	30	70	-	-	100
	Municipal Engineering											
	Mining Technology											
	Town & Country Planning											
	Transmission Line Survey											
5	^ψ Survey Training Camp	3	-	-	^ψ 3	-	-	-	-	75	75	150
6	GIS and GPS Applications	2	-	-	3	-	-	-	-	25	25	50
7	Survey Software	2	-	-	3	-	-	-	-	25	25	50
8	Professional Practice IV	2	-	-	3	-	-	-	-	25	25	50
9	Survey Engineering Project II	2	-	-	4	-	-	-	-	50	50	100
10	General Viva-Voce	1	-	-	-	-	-	-	-	-	100	100
	TOTAL	25	15	2	15	40	80	120	280	200	300	900

STUDENT CONTACT HOURS PER WEEK: 32 Hrs.
 Theory and Practical Period of 60 Minutes each.
 # - External Assessment @ - Internal Assessment, **ESE** - End Semester Exam, **CT**- Class Test, **TA** - Teachers Assessment.
 L – Lecturer, TU –Tutorial, PR – Practical, **TA** – Teachers’ Assessment, **CT** – Class Test, **ESE** – End Semester Exam. **TW** – Term Work.

^ψ In lieu of 3 pds/week, 2 weeks extensive field work be arranged and 3 pds/week may be used for office computation, Class routine should be framed accordingly and the above-mentioned marks for the subject will be awarded to the students on the basis of report submitted

Name of the Course : SURVEY ENGINEERING (INDUSTRIAL MANAGEMENT)	
Course code : SE / S6 / T1 / IM	Semester : SIXTH
Duration : 15 weeks	Maximum Marks : 100
Teaching Scheme	Examination Scheme
Theory : 4 hrs/week	Mid Semester Exam / CT : 20 Marks
Tutorial: - hrs/week	Attendance, Assignment & Quiz : 10 Marks
Practical : - hrs/week	End Semester Exam: 70 Marks
Credit :- 3	
Details syllabus as per common syllabus of all discipline	

Name of the Course : SURVEY ENGINEERING (ENVIRONMENTAL ENGINEERING)	
Course code : SE / S6 / T2 / EE	Semester : SIXTH
Duration : 15 weeks	Maximum Marks : 100
Teaching Scheme	Examination Scheme
Theory : 4 hrs/week	Mid Semester Exam / CT : 20 Marks
Tutorial: - 1 hrs/week	Attendance, Assignment & Quiz : 10 Marks
Practical : - hrs/week	End Semester Exam: 70 Marks
Credit :- 4	
Details syllabus as per common syllabus of all discipline	

Name of the Course : SURVEY ENGINEERING (PHOTOGRAMMETRY AND REMOTE SENSING)			
Course code : SE / S6 / T3 / PRS		Semester : SIXTH	
Duration : 15 weeks		Maximum Marks : 100	
Teaching Scheme		Examination Scheme	
Theory : 4 hrs/week		Mid Semester Exam / CT : 20 Marks	
Tutorial: - hrs/week		Attendance, Assignment & Quiz : 10 Marks	
Practical : - hrs/week		End Semester Exam: 70 Marks	
Credit :- 3			
Aim :-			
S.No			
1.	Developing the survey skill required for survey engineering.		
Objective :-			
S.No	Students will be able to:		
1.	Gather knowledge of photogrammetry and remote sensing.		
Pre-Requisite :-			
S.No			
1.	Students should have the basic knowledge of surveying.		
Contents :		Hrs/unit	Marks
Unit -1	1.0 PHOTOGRAMMETRY 1.1. Scope, importance & different type of photogrammetry surveying 1.2. Principles of terrestrial photogrammetry :- Different methods adopted: (1) Graphical method (2) Analytical method, Stereo photogrammetry & field work; Elementary idea about photogrammetry surveying. 1.3. Aerial photogrammetry, Flying photography, Ground controls & compilation or mapping. Elementary ideas of instruments used in aerial surveying such as : (a) Aeroplane (b) Aerial camera (c) Accessories required for interpretation & plotting. 1.4. Terminology used in Aerial photogrammetry like perspective centre, plumb points, principal points, Isocentres, principal plane. Horizontal Trace & plate parallels, Scales & Distortion of the vertical photograph, Distortion of the vertical photograph, Distortion due to height or relief, Scale & Distortion of the oblique photograph.	30	35
Unit -2	2.0 REMOTE SENSING 2.1 Define Remote Sensing? Why Remote Sensing ? 2.2 ELECTRO MAGNETIC RADIATION - Electromagnetic Spectrum, Absorption, Scattering, Interaction of EMR with matter on the Surface of the earth, Spectral Signature of vegetation ,geological matter, Spectral characteristics of water and snow etc. 2.3 IMAGING SYSTEM - Background, Land sat series of	30	35

	<p>satellites, SPOT, IRS satellites, IRS-1C/1D etc.</p> <p>2.4 VISUAL INTERPRETATION - Types of data products, Image interpretation Technique - Determination, recognition, identification, Tone and colour pattern, texture-size, shape, shadow, Location, resolution, Instruments-magnifying lenses, Stereoscope Radial line plotter, Parallax bar, Optical Pantograph, additive colour viewer etc.</p> <p>2.5 HARDWARE AND SOFTWARE OPTIONS - Generation of computers, Selection of hardware- scanners, Plotters, Selection of Storage devices, Photo write systems, Geographical Information System, Land Information systems, Geographical Positioning Systems etc.</p> <p>2.6 PRE PROCESSING AND RECTIFICATION - Radiometric Correction, Atmospheric scattering correction, Geometric distortion, Earth rotation correction, Altitude, Ground Control points, image to map transformation model, Map digitizer model, Acquisition of GCPs, updating of image-map transformation model, resampling or interpolation of gray values, nearest neighborhood, bilinear interpolation, Cubic convolution, Registration or image to image rectification etc.</p> <p>2.7 ENHANCEMENT TECHNIQUES - Contrast stretch or enhancement, linear contrast stretch, Histogram equalization, computation of transformation functions, Logarithmic contrast enhancement, exponential contrast enhancement, Gaussian Stretch.</p> <p>2.8 SPATIAL FILTERING - How Filtering is done, Noise removal, Averaging, Median filtering, edge enhancement filtering, statistical differences, Fourier transformation, Normalisation or range compression etc.</p> <p>2.9 BAND COMBINATION - Linear combination, Brightness or square root of sum of squares- Post Normalisation, Principal Component Analysis, Mathematics of Principal component, Alternative method of determining of eigen vectors.</p> <p>2.10 CLASSIFICATION TECHNIQUES - Graphical presentation of pattern recognition, Selection of bands, Variance-Covariance Matrix, Correlation matrix, statistical schemes, Supervised Classification, Training site selection, unsupervised classifications etc.</p> <p>2.11 DIGITAL IMAGE PROCESSING - Digital Image fundamentals & transformations - Define Image, Dynamic Range, Brightness, Defined Tapered Quantification, Define gray level, define resolution & pixel, Steps involve in DIP, Elements of DIP, categories of digital storage, differentiate photopic & scotopic vision, define subjective brightness and brightness adoption, what is waber ratio, define machband effect, simultaneous contrast, define illumination and reflectance. Elements of visual perceptions, short note on sampling and quantization. Image Restoration - Define image restoration, linear operator, Properties of linier Operator, degradation process, Define circular matrix, types of noise models, noise probability density function, unconstrained restoration, different types of filtering. Image Compression - Define Image Compression, data compression, Type of Data</p>		
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	Compression, Method of compression, Redundancy, coding, Compression Ratio, Encoder, Decoder. 2.12 APPLICATION TRENDS - Agriculture – Land use/Land cover, Visual Interpretation, Digital Image Processing, Soil Mapping, Crop Inventory, Crop production forecasting, Emerging Indian scenario etc.		
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Text Books:-

Sl. No.	Titles of the Book	Name of Authors	Name of the Publisher
1	Surveying and Levelling (Vol. 3)	Dr. B. C. Punmiya	Laxmi Publication
2	Surveying and Levelling (Vol. 2)	S. K. Duggal	TATA MC GRAW-HILL
3	Higher Surveying	Dr. A.M.Chandra	NEW AGE INTERNATIONAL
4	Surveying (Vol. 3)	Dr. K. R. Arora	STANDARD BOOK HOUSE
5	Fundamentals of Surveying	S. K. Roy	PHI Learning Pvt. Ltd.

Reference books :- Nil

Suggested List of Laboratory Experiments :- Nil

Suggested List of Assignments/Tutorial :- Nil

Name of the Course : SURVEY ENGINEERING (MUNICIPAL ENGINEERING [ELECTIVE])			
Course code : SE / S6 / T4(E1) / ME		Semester : SIXTH	
Duration : 15 weeks		Maximum Marks : 100	
Teaching Scheme		Examination Scheme	
Theory : 3 hrs/week		Mid Semester Exam / CT : 20 Marks	
Tutorial: - 1 hrs/week		Attendance, Assignment & Quiz : 10 Marks	
Practical : - hrs/week		End Semester Exam: 70 Marks	
Credit :- 3			
Aim :-			
S.No			
Objective :-			
S.No	Students will be able to:		
Pre-Requisite :-			
S.No			
Contents :		Hrs/unit	Marks
Unit -1	1.0 ENVIRONMENTAL STUDY 1.1. Water supply from wells, tube wells, surface intake, determination of yield, per capita demand. 1.2. Quality of water : Water analysis, physical test, chemical test, living organism in water, Biological tests.	15	20
Unit -2	2.0 PURIFICATION OF WATER 2.1. Plain sedimentation., Sedimentation with coagulation, Filtration, Disinfections, softening and other miscellaneous methods 2.2. Water distribution systems and Networks.	15	20
Unit -3	3.0 SYSTEM OF SANITATION 3.1. Methods of collection, conservancy system, water carriage systems, merits and demerits of conservancy and water carriage systems. 3.2. Sewer appurtenances 3.3. Microbiology of sewerage 3.4. Swage treatment methods : Preliminary process, Biological process. 3.5. Solid waste collection and disposal methods. 3.6. Air pollution : sample survey and analysis.	30	30
Text Books:-			
Sl. No.	Titles of the Book	Name of Authors	Name of the Publisher
Reference books :- Nil			
Suggested List of Laboratory Experiments :- Nil			
Suggested List of Assignments/Tutorial :- Nil			

Name of the Course : SURVEY ENGINEERING (MINING TECHNOLOGY [ELECTIVE])				
Course code : SE / S6 / T4(E2) / MT		Semester : SIXTH		
Duration : 15 weeks		Maximum Marks : 100		
Teaching Scheme		Examination Scheme		
Theory : 3 hrs/week		Mid Semester Exam / CT : 20 Marks		
Tutorial: - 1 hrs/week		Attendance, Assignment & Quiz : 10 Marks		
Practical : - hrs/week		End Semester Exam: 70 Marks		
Credit :- 3				
Aim :-				
S.No				
1.	Developing the mining skill required for survey engineering.			
Objective :-				
S.No	Students will be able to:			
1.	Gather knowledge about method of works in underground.			
2.	Gather knowledge about method of works in surface.			
3.	Gather knowledge about mine ventilation.			
Pre-Requisite :-				
S.No				
1.				
Contents :			Hrs/unit	Marks
Unit -1	1.0 WINING & WORKING 1.1. Modes of entry by Adits, inclines & shafts –their applicability & comparison. 1.2. Board & Pillar method – Applicability, merits & demerits, development work, percentage of extraction, determination of panel size, depillaring by caving & stowing. 1.3. Longwall Workings – Applicability, merits & demerits- Advancing & retreating longwall.		18	20
Unit -2	2.0 OPENCAST MINING 2.1. Applicability, Advantages & disadvantages. 2.2. Mineral: OB ratio, stripping ratio, break-even stripping ratio. 2.3. Opencast layout with all combination.		12	15
Unit -3	3.0 METAL MINING (UNDERGROUND) 3.1. Development of underground metalliferous deposits, brief discussion on different raising methods. 3.2. Classification of stoping methods; brief discussion on working principles of breast stoping, shrinkage stoping, cut & fill stoping, post-pillar method of stoping, Top slicing, sub-level stoping.		12	15
	4.0 VENTILATION 4.1. Natural ventilation & motive column, laws of mine air		18	20

Unit -4	friction. 4.2. Construction & uses of ventilation stopping, air-crossing, V-door, regulator & brattice partitions. 4.3. Homotropical & Antitropical ventilation, splitting of air current.		
Text Books:-			
Sl. No.	Titles of the Book	Name of Authors	Name of the Publisher
1.	Elements of Mining Technology (Vol. 1, 2)	D. J. Deshmukh	Vidyasewa Prakashan
2.	Mine Environment and Ventilation	G. B. Mishra	
Reference books :- Nil			
Suggested List of Laboratory Experiments :- Nil			
Suggested List of Assignments/Tutorial :- Nil			

Name of the Course : SURVEY ENGINEERING (TOWN & COUNTRY PLANNING [ELECTIVE])			
Course code : SE / S6 / T4(E3) / TCP		Semester : SIXTH	
Duration : 15 weeks		Maximum Marks : 100	
Teaching Scheme		Examination Scheme	
Theory : 3 hrs/week		Mid Semester Exam / CT : 20 Marks	
Tutorial: - 1 hrs/week		Attendance, Assignment & Quiz : 10 Marks	
Practical : - hrs/week		End Semester Exam: 70 Marks	
Credit :- 3			
Aim :-			
S.No			
1.			
Objective :-			
S.No	Students will be able to:		
1.			
Pre-Requisite :-			
S.No			
1.			
Contents :		Hrs/unit	Marks
Unit -1	1.0 TOWN PLANNING 1.1 Historical back ground 1.2 Classic city & medieval towns 1.3 Indian towns 1.4 Town and environment 1.5 Physical planning of residential areas 1.6 Land use maps 1.7 Traffic networks 1.8 Landscaping 1.9 Site leveling 1.10 Sanitary requirements	30	35
Unit -2	2.0 COUNTRY PLANNING 2.1 Concepts of region. 2.2 Contour maps 2.3 Zoning 2.4 Rural and urban sociology 2.5 Industrial, commercial and agricultural regions 2.6 Metropolitan development.	30	35
Text Books:-			
Sl. No.	Titles of the Book	Name of Authors	Name of the Publisher
Reference books :- Nil			
Suggested List of Laboratory Experiments :- Nil			
Suggested List of Assignments/Tutorial :- Nil			

Name of the Course : SURVEY ENGINEERING (SURVEY TRAINING CAMP)	
Course code : SE / S6 / P1 / STC	Semester : SIXTH
Duration : 15 weeks	Maximum Marks : 150
Teaching Scheme	Examination Scheme
Theory : - hrs/week	Continuous Internal Assessment : 75 Marks
Tutorial: - hrs/week	Attendance, Assignment & Quiz : - Marks
Practical : 3 hrs/week (Office Works) + 2 weeks (Field Works)	External Assessment : 75 Marks
Credit :- 3	
Aim :-	
S.No	
1.	Developing the survey skill required for survey engineering.
Objective :-	
S.No	Students will be able to:
1.	Record and observe necessary observation with the survey instruments
2.	Compute necessary survey data from field observation for drawing.
3.	Prepare drawing using survey data.
INSTRUCTIONS:	
S.No	
1.	Group size for survey practical work should be maximum 6 students.
2.	Each student from a group should handle the instrument independently to understand the function of different components and use of the instrument.
3.	Drawing and plotting should be considered as part of practical.
4.	Term work shall consist of record of all practical and projects in field book and drawing of Project work on full / half imperial size drawing sheets.
Pre-Requisite :-	
S.No	
1.	Perfection in drawing and sketching.
2.	Students should have knowledge of Surveying.
Contents : (Practical)	
Sl. No.	Assignments
1.	Preparation of Topo-Map (1 Sq. Km.)
2.	Indirect contouring by square method
3.	Indirect contouring by Total Station / Tacheometer.
4.	Minor triangulation with single chain of triangle
5.	Trilateration with Braced Quadrilaterals covering an Area of 1.5 Sq. Km.)
Text Books:-	

Sl. No.	Titles of the Book	Name of Authors	Name of the Publisher
1	Surveying and Levelling	N N Basak	Tata Mc Graw-Hill
2	Surveying and Levelling (Part I, 2)	T .P. Kanetkar & S. V, Kulkarni	PUNE VIDHYARTHI GRIHA Prakashan
3	Surveying and Levelling (Vol. I, 2, 3)	Dr. B. C. Punmiya	Laxmi Publication
4	Text book of Surveying	S.K.Husain, M.S. Nagaraj	S. Chand and company
5	Surveying and Levelling (Vol. I, 2)	S. K. Duggal	TATA MC GRAW-HILL
6	Plane Surveying	Dr. A.M.Chandra	NEW AGE INTERNATIONAL
7	Surveying (Vol. I, 2, 3)	Dr. K. R. Arora	STANDARD BOOK HOUSE
8	Fundamentals of Surveying	S. K. Roy	PHI Learning Pvt. Ltd.
Reference books :- Nil			
Suggested List of Laboratory Experiments :- Nil			
Suggested List of Assignments/Tutorial :- Nil			

Name of the Course : SURVEY ENGINEERING (GIS AND GPS APPLICATIONS)			
Course code : SE / S6 / P2 / GGA		Semester : SIXTH	
Duration : 15 weeks		Maximum Marks : 50	
Teaching Scheme		Examination Scheme	
Theory : - hrs/week		Continuous Internal Assessment : 25 Marks	
Tutorial: - hrs/week		Attendance, Assignment & Quiz : - Marks	
Practical : 3 hrs/week		External Assessment : 25 Marks	
Credit :- 2			
Aim :-			
S.No			
1.	Developing the survey skill required for survey engineering.		
Objective :-			
S.No	Students will be able to:		
1.	Work with GPS		
2.	Work with GIS		
Pre-Requisite :-			
S.No			
1.	Students should have basic knowledge of Computer.		
2.	Students should have basic knowledge of Surveying.		
Contents : (Practical)			
Sl. No.	Assignments		
1.	Survey with GPS		
2.	GIS applications.		
Text Books:-			
Sl. No.	Titles of the Book	Name of Authors	Name of the Publisher
Reference books :- Nil			
Suggested List of Laboratory Experiments :- Nil			
Suggested List of Assignments/Tutorial :- Nil			

Name of the Course : SURVEY ENGINEERING (SURVEY SOFTWARE)	
Course code : SE / S6 / P3 / SS	Semester : SIXTH
Duration : 15 weeks	Maximum Marks : 50
Teaching Scheme	Examination Scheme
Theory : - hrs/week	Continuous Internal Assessment : 25 Marks
Tutorial: - hrs/week	Attendance, Assignment & Quiz : - Marks
Practical : 3 hrs/week	External Assessment : 25 Marks
Credit :- 2	
Aim :-	
S.No	
1.	Developing the computerized survey technique required for survey engineering.
Objective :-	
S.No	Students will be able to:
1.	Work with survey software.
Pre-Requisite :-	
S.No	
1.	Students should be conversant with Computer environment.
2.	Students should be conversant with CAD software.
3.	Students should have basic knowledge of Surveying.
Contents : (Practical)	
Sl. No.	Assignments
1.	Spreadsheet : Practice with Survey related calculation like computation of independent coordinates from length and bearing, computation of R. L. of target points from BS, IS and FS etc.
2.	Downloading the Total Station data to the PC.
3.	Processing the Total Station data with the help of Notepad and Excel.
4.	Plotting the contour lines with the help of AutoCIVIL / Civil 3D software / any other Software.
5.	Creation of name plate and make the drawing ready for plotting in AutoCAD / ZWCAD environment.
Text Books:- NIL	
Reference books :- Nil	
Suggested List of Laboratory Experiments :- Nil	
Suggested List of Assignments/Tutorial :- Nil	

Name of the Course : SURVEY ENGINEERING (PROFESSIONAL PRACTICE IV)	
Course code : SE / S4 / P4 / PP4	Semester : SIXTH
Duration : 15 weeks	Maximum Marks : 50
Teaching Scheme	Examination Scheme
Theory : - hrs/week	Continuous Internal Assessment : 25 Marks
Tutorial: - hrs/week	Attendance, Assignment & Quiz : - Marks
Practical : 3 hrs/week	External Assessment : 25 Marks
Credit :- 2	
Aim :-	
S.No	
1.	Development and evaluation of individual skills.
2.	Enhancement in soft skills through innovation.
Objective :-	
S.No	Students will be able to:
1.	Acquire information from different sources.
2.	Prepare notes for given topic.
3.	Present given topic in a seminar.
4.	Interact with peers to share thoughts.
5.	Prepare a report on industrial visit, expert lecture.
Pre-Requisite :-	
S.No	
1.	Communication skill must be perfect.
Contents : (Practical)	
Sl. No.	Assignments
1.	Industrial Visits Structured industrial visits be arranged and report of the same should be submitted by the individual student, to form a part of the term work. Industrial visits may be arranged in the following areas / industries: Survey Site
2.	Lectures by Professional / Industrial Expert be organized from different types of Survey instruments / software.
3.	Individual Assignments : Seminar and report preparation.
Text Books:- Nil.	
Reference books :- Nil	
Suggested List of Laboratory Experiments :- Nil	
Suggested List of Assignments/Tutorial :- Nil	

Name of the Course : SURVEY ENGINEERING (SURVEY ENGINEERING PROJECT II)	
Course code : SE / S4 / P5 / SEP2	Semester : SIXTH
Duration : 15 weeks	Maximum Marks : 100
Teaching Scheme	Examination Scheme
Theory : - hrs/week	Continuous Internal Assessment : 50 Marks
Tutorial: - hrs/week	Attendance, Assignment & Quiz : - Marks
Practical : 4 hrs/week	External Assessment : 50 Marks
Credit :- 2	
Aim :-	
S.No	
1.	
Objective :-	
S.No	Students will be able to:
1.	Acquire knowledge on road construction.
Pre-Requisite :-	
S.No	
1.	Students should have basic knowledge of Surveying.
Contents : (Practical)	
Sl. No.	Assignments
1.	ROAD PROJECT (Survey work should be not less than 2 kms) 1.1.Necessity and purpose of road. 1.2.socio-economic survey of the village/town/city 1.3 Making the tentative alignment 1.4 Reconnaissance survey 1.5 Preliminary location survey 1.6 Formation line construction. 1.7 Final location survey 1.8 Longitudinal section of the road 1.9 Cross sections of the road 2.0 Economic cutting-filling calculation 2.0 Rough cost estimation of the proposed road 2.1 Mass haul diagram 2.2 Correction of road curvature

2.	<p>2.3 A REPORT ON ROAD PROJECT (Report prepared should include information related to the following):-</p> <ul style="list-style-type: none"> i) Introduction to the project ii) Necessity and background of project iii) Socio-economic survey and rainfall data/record of HFL iv) Justification for selection of the final alignment v) Estimate: Earthwork, Road surface, Drainage etc. vi) Brief specification with rough cost estimate of the project vii) Overall benefit of the project viii) Conclusion and recommendation
3.	<p>2.4 MAPS SHOULD BE SUBMITTED ALONGWITH THE PROJECT</p> <ul style="list-style-type: none"> i) General map of the area though which proposed road will pass. ii) Route map/key plan iii) Longitudinal and cross sections of the proposed road iv) Sketch plan of curve detail.
Text Books:- Nil.	
Reference books :- Nil	
Suggested List of Laboratory Experiments :- Nil	
Suggested List of Assignments/Tutorial :- Nil	