PROPOSED

5TH SEMESTER

CURRICULAR STRUCTURE

AND

SYLLABI OF

FULL-TIME DIPLOMA COURSE IN

SURVEY ENGINEERING

PROPOSED CURRICULAR STRUCTURE FOR FIFTH 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: **FIFTH**			
SL. NO.	SUBJECT	CREDITS	PERIODS			EVALUATION SCHEME						
			L	TU	PR	INTERNAL SCHEME			ESE	PR #	TW @	TOTAL MARKS
						TA	CT	TOTAL				
1	Geodesy & Astronomy	3	3	1	-	10	20	30	70	-	-	100
2	GIS and GPS Applications	2	2	-	-	5	10	15	35	-	-	50
3	Cartography	3+1	3	-	2	10	20	30	70	25	25	150
4	Triangulation & Trilateration	3	3	-		10	20	30	70		-	100
5	Design of R.C.C. Structure	4	4	-	-	10	20	30	70	-	-	100
6	Civil Engineering Drawing-II	2	-	-	3	-	-	-	-	25	25	50
7	Professional Practice III	2	-	-	3	-	-	-	-	25	25	50
8	Survey Engineering Project I	2	-	-	3	-	-	-	-	50	50	100
9	Field Survey Practices – III	3	-	-	6	-	-	-	-	50	50	100
	TOTAL	**25**	**15**	**1**	**17**	**45**	**90**	**135**	**315**	**175**	**175**	**800**

STUDENT CONTACT HOURS PER WEEK: 33 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.

Name of the Course : SURVEY ENGINEERING (GEODESY & ASTRONOMY)			
Course code : SE / S5 / T1 / GA		**Semester : FIFTH**	
Duration : 15 weeks		**Maximum Marks : 100**	
Teaching Scheme		**Examination Scheme**	
Theory : 3 hrs/week		Mid Semester Exam / CT : 20 Marks	
Tutorial: - 1hrs/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 about geodetic surveying and field astronomy.		
Pre-Requisite :-			
S.No			
1.	Students should have the knowledge of basic surveying.		
Contents :		Hrs/unit	Marks
Unit -1	**1.0** **TRIGONOMETRICAL LEVELLING** 1.1 Indirect levelling. 1.2 Levelling on step ground. 1.3 Base of an object accessible. 1.4 Base of an object inaccessible. 1.5 Two stations not in the same vertical plane. 1.6 Curvature and refraction. 1.7 Axis-signal correction. 1.8 The difference of elevation by single observation. 1.9 The difference of elevation by double observation. **PRECISE LEVELLING** 1.10 Order of precision. 1.11 Field procedure in geodetic levelling. 1.12 Correction for collimation, curvature, refraction. 1.13 Adjustment of level net.	23	35
Unit -2	**2.0** **GEODESIC SURVEY** 2.1 Length of great circle arc. 2.2 Length of small circle arc.	22	35

	2.3 Formula for spherical trigonometry. 2.4 Area of spherical triangle. 2.5 Latitude and longitude. **FIELD ASTRONOMY** 2.6 Astronomical terms. 2.7 Coordinates system. 2.8 Astronomical triangle. 2.9 Determination of times by astronomical observation. 2.10 Determination of azimuth. 2.11 Determination of latitude of place. 2.12 Conversion of spherical to rectangular coordinates and vice-versa.		

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 2)	**T .P. Kanetkar & S. V, Kulkarni**	PUNE VIDHYARTHI GRIHA Prakashan
3	Surveying and Levelling (Vol. 2, 3)	**Dr. B. C. Punmiya**	Laxmi Publication
4	Surveying and Levelling (Vol. 2)	**S. K. Duggal**	TATA MC GRAW-HILL
5	Higher Surveying	**Dr. A.M.Chandra**	NEW AGE INTERNATIONAL PUBLISHERS
6	Surveying (Vol. 2, 3)	**Dr. K. R. Arora**	STANDARD BOOK HOUSE
7	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 / S5 / T2 / GGA		**Semester : FIFTH**	
Duration : 15 weeks		**Maximum Marks : 50**	
Teaching Scheme		**Examination Scheme**	
Theory : 2 hrs/week		Mid Semester Exam / CT : 10 Marks	
Tutorial: - hrs/week		Attendance, Assignment & Quiz : 5 Marks	
Practical : - hrs/week		End Semester Exam: 35 Marks	
Credit :- 2			
Aim :-			
S.No			
1.	Study of Geographical Information System and Global Positioning System.		
Objective :-			
S.No	Students will be able to:		
1.	Know theory and application of GPS.		
2.	Familiar with GIS.		
Pre-Requisite :-			
S.No			
1.	Student should have knowledge of basic Surveying.		
Contents :		Hrs/unit	Marks
Unit -1	**GPS (Global Positioning System) :** Basic concept of GPS, operations, accuracy, limitation of GPS & DGPS, error sources and analysis, methodology for collection of data, adjustment computations and analysis,	15	18
Unit - 2	**GIS (Geographical Information System) :** Basic Principles, GIS Hardware & Software, Relating information from different sources, Data Representation, Data Capture, raster-vector formats, data conversion methods, Projections, Coordinate systems and registrations, Spatial analysis, Data output and Cartography, Graphic Display Technique, Data Mining, GIS Software, RS & GIS, Digital Topographical Data Standards, Application of RS based GIS, Assessment of GIS Packages, GIS & Private Sectors.	15	17

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 (CARTOGRAPHY)			
Course code : SE / S5 / T3 / C (Theory)		**Semester : FIFTH**	
Course code : SE / S5 / P1 / C (Practical)		**Maximum Marks : 100 + 50**	
Duration : 15 weeks		**Examination Scheme**	
Teaching Scheme		Mid Semester Exam / CT : 20 Marks	
Theory : 3 hrs/week		Attendance, Assignment & Quiz : 10 Marks	
Tutorial: - hrs/week		End Semester Exam: 70 Marks	
Practical : - 2 hrs/week		Continuous Internal Assessment : 25 Marks	
Credit :- 3 + 1		External Assessment : 25 Marks	
Aim :-			
S.No			
1.	Developing the survey skill required for survey engineering.		
Objective :-			
S.No	Students will be able to:		
1.	Gather preliminary knowledge of cartography.		
2.	Gather knowledge about cartographic technique.		
3.	Gather knowledge of map projection.		
Pre-Requisite :-			
S.No			
1.	Students should have the knowledge of basic surveying with drawing and sketching.		
Contents : (Theory)		Hrs/unit	Marks
Unit -1	**1.0** **CARTOGRAPHY** 1.1 Principle of cartography, definitions. 1.2 Elements of map 1.3 Elements of common surveyors projections. 1.4 Utility of map. 1.5 Study of topo-map on 1 : 50000 and 1 : 250000 **CARTOGRAPHIC TECHNIQUES** 1.6 Base materials, instruments, inks and pens. 1.7 Drawing of points, lines. 1.8 Point symbols, line symbols, area symbols & relief features, principles of lettering, type of lettering. 1.9 Lettering devices. 1.10 Map numbering, 1.11 Difference between map & photo. **SCRIBING** 1.12 Advances of scribing techniques, base materials, instruments, scribing processes. 1.13 Advantage of scribing over conventional system.	22	35

Unit -2	**2.0** **MAP REPRODUCTION** 2.1 Process camera, photographical copying techniques, colour separation, negative. 2.2 Plate making, offset and rotary printing process. 2.3 Computerized Map Reproduction Technique. **MAP PROJECTION** 2.4 Principles; Different types of projection and their properties - Mercator, Transverse Mercator (TM), Universal Transverse Mercator (UTM), Grids etc. 2.5 Computation in Grid – Geographical to UTM and vice versa.	23	35

Contents : (Practical)

Sl. No.	Assignments
1	DRAWING OF STRAIGHT LINES – I : To draw free hand straight line by pencil.
2	DRAWING OF CURVED LINES – I : To draw free hand curved line by pencil.
3	DRAWING OF STRAIGHT LINES – II : To draw free hand straight line by ink and isograph / rotring.
4	DRAWING OF CURVED LINES – II : To draw free hand curved line by ink and isograph / rotring.
5	DRAWING OF CONTOUR LINES – I : To draw contour lines by pencil.
6	DRAWING OF CONTOUR LINES – II : To draw contour lines by ink and isograph / rotring.
7	DRAWING OF SYMBOLS : To draw some simple symbols.
8	INK UP OF MAP : To ink up map from blue print.
9	PREPARATION OF BAR GRAPH ETC. : To prepare bar graph, pie chart and coloured thematic mapping.

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 (TRIANGULATION & TRILATERATION)			
Course code : SE / S5 / T4 / TT		**Semester : FIFTH**	
Duration : 15 weeks		**Maximum Marks : 100**	
Teaching Scheme		**Examination Scheme**	
Theory : 3 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 methods for fixing of horizontal control points.		
Pre-Requisite :-			
S.No			
1.	Students should have the knowledge of basic surveying with drawing and sketching.		
Contents :		Hrs/unit	Marks
Unit -1	**ERROR ADJUSTMENT** 1.1. Classification of errors. 1.2. Laws of accidental errors. 1.3. Most probable values of directly and indirectly observed independent quantities. 1.4. Least square. 1.5. Normal equation. 1.6. Method of co-relates. **TRIANGULATION** 1.7 Classification of triangulation system. 1.8 Triangulation figures. 1.9 Triangulation system adopted in India. 1.10 Strength of figure. 1.11 Selection of station. 1.12 Observation of horizontal angles. 1.13 Base line extension. 1.14 Stations. 1.15 Base line measurement. 1.16 Corrections to the base line. 1.17 Phase error 1.18 Intervisibility 1.19 Satellite station 1.20 Different types of application of triangulation survey. 1.21 Adjustment of different types of triangulation figure by equal shift method only. 1.22 Numerical problems.	25	40

Unit -2	**TRILATERATION** 2.1 Introduction 2.2 Use of Trilateration 2.3 Advantage and Disadvantage of Trilateration 2.4 Comparison of Trilateration with Triangulation 2.5 Geometrical figures used in Trilateration 2.6 Reconnaissance in Trilateration 2.7 Precision in Trilateration 2.8 Reduction of slope distance from vertical angles 2.9 Reduction of slope distance from elevations 2.10 Adjustment in Trilateration (Adjustment of a Braced Quadrilateral).	20	30

Text Books:-

Sl. No.	Titles of the Book	Name of Authors	Name of the Publisher
1	Surveying and Levelling (Vol. 2, 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 PUBLISHERS
4	Surveying (Vol. 2, 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 (DESIGN OF R.C.C. STRUCTURE)			
Course code : SE / S5 / T5 / DRCCS		**Semester : FIFTH**	
Duration : 15 weeks		**Maximum Marks : 50**	
Teaching Scheme		**Examination Scheme**	
Theory : 3 hrs/week		Mid Semester Exam / CT : 20 Marks	
Tutorial: - 1hrs/week		Attendance, Assignment & Quiz : 10 Marks	
Practical : - hrs/week		End Semester Exam: 70 Marks	
Credit :- 3			
Aim :-			
S.No			
1.	Study of design of structure.		
Objective :-			
S.No	Students will be able to:		
1.	Understand the basic principles of design of R.C.C. structure.		
Pre-Requisite :-			
S.No			
1.	Student should be perfect in engineering mechanics		
2.	Student should know the properties of materials being used.		
Contents :		Hrs/unit	Marks
Unit -1	**INTRODUCTION** 1.0 Introduction to BIS: 875 1.1. General concept of loads on structures. 1.2. Different types of loads, dead load, super imposed load (live load), wind load seismic load, hydrostatic pressure , earth pressure, moving load . 1.3. Load on different types pf structures like buildings, workshops , water tanks and lowers. 1.4. Methods of design : working stress, limit state method. **RCC DESIGN OF BEAMS** 1.5 REINFORCED CEMENT CONCRETE 1.6 Element of R.C.C. Design. 1.7 Complete design of a simply supported singly reinforced R.C.C. rectangular beams, double reinforced rectangular and 'T' beams, shear force and bond in RCC members. **RCC DESIGN OF SLABS** 1.8 Complete design with detailing of one-way simple supported and cantilever slab. 1.9 Design of two- way slabs and details of reinforcement.	25	40
	RCC DESIGN OF COLUMNS 2.1 Difference between short and long columns. Design of a axially loaded short column by IS code formula and details and details of reinforcement. 2.2 Design of isolated RCC footing and reinforcement details.	20	30

Unit -2	**RCC DESIGN OF STAIRCASE** 2.3 General concept of continuous beams and slabs, combined footing , strip foundation, mat & raft foundation, RCC pile foundation .(not involving structural details.) 2.4 Design & detailing of RCC staircases of simple slab type. 2.5 Concept of continuous beams, slabs, combined footing, PCC pile (not involving structural design).		

Text Books:-

Sl. No.	Titles of the Book	Name of Authors	Name of the Publisher
1.	Design of Reinforced Concrete Structure	N. Subramanian	Oxford University Press
2.	Reinforced Concrete	Punmia Jain Jain	

Reference books :- Nil

Suggested List of Laboratory Experiments :- Nil

Suggested List of Assignments/Tutorial :- Nil

Name of the Course : SURVEY ENGINEERING (CIVIL ENGINEERING DRAWING - II)	
Course code : SE / S5 / P1 / CED2	**Semester : FIFTH**
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.	To develop the ideas, vision and its practical reality through engineering graphics.
2.	Developing the approach of visualization, drafting, modeling and analysis.

Objective :-

S.No	Students will be able to:
1.	Read, interpret and draw the building drawings.
2.	Prepare working drawings for the building.
3.	Apply the building rules, regulations and byelaws

Pre-Requisite :-

S.No	
1.	Perfection in geometry and sketching.
2.	The students should be perfect in plotting the geometrical shapes and skill of reading the geometrical designs.

Contents : (Practical)

Sl. No.	**Assignments : Following exercises should be drawn on full imperial size drawing sheets.**
1.	**PLATE-1** 1.0 **RCC DETAILS OF COLUMN & COLUMN FOOTING,ROOF SLAB,BEAMS** RCC Detail for : i) Column with footing –Plan , Sectional elevation. ii) A continuous beam over columns –Half long section/two cross sections / One mid section, One support section. iii) One way slab reinforcement : plan /sectional elevations 2.0 **RCC DETAIL INCLUDING BAR BENDING SCHEDULE AS IS CODE-2502 FOR SLABS** RCC Detail inclusive of bar bending schedule (as per IS code-2502)for: i) A two way slab reinforcement plan with corner reinforcement and sectional Elevation.
2.	**PLATE-2 : DOORS AND WINDOWS** i) Front elevation, sectional side elevation showing details of joints of the following. ii) $^{1}/_{3}$ paneled and $^{2}/_{3}$ glazed door iii) Fully paneled door

Text Books:-

Sl. No.	**Titles of the Book**	**Name of Authors**	**Name of the Publisher**

1	Civil Engineering Drawing	**Malik & Mayo**	New Asian Publishers New Delhi
2	Elements of Building Drawing	**D. M. Mahajan**	
Reference books :- Nil			
Suggested List of Laboratory Experiments :- Nil			
Suggested List of Assignments/Tutorial :- Nil			

Name of the Course : SURVEY ENGINEERING (PROFESSIONAL PRACTICE III)	
Course code : SE / S4 / P2 / PP3	**Semester : FIFTH**
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 I)	
Course code : SE / S4 / P3 / SEP1	**Semester : FIFTH**
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 : 3 hrs/week	External Assessment : 50 Marks
Credit :- 2	

Aim :-

S.No	
1.	Land development and planning of small township.

Objective :-

S.No	Students will be able to:
1.	Acquire knowledge on development of land for new small township and lay out on topographical map.

Pre-Requisite :-

S.No	
1.	Students should have basic knowledge of Surveying.

Contents : (Practical)

Sl. No.	**Assignments**
1.	**LAND DEVELOPMENT & PLANNING OF SMALL TOWNSHIP (SURVEY) (ON EXISTING TOPOGRAPHIC MAP)** (Topographical area not less that 1 sq. Km.) 1.1 Introduction and purpose 1.2 Site selection for proposed township 1.3 Reconnaissance survey and data collection: Socio-economic/rainfall/HFL 1.4 Land development planning &Preparation of the following maps on topo-map ; i) Street map/Water supply and Surface drains map/Electrification map ii) Master plan
2.	**REPORT ON PROJECT** (Report prepared should include information related to the following) i) Introduction ii) Necessity and back ground of the township iii) Data: Socio-Economic survey/ rainfall/ HFL iv) Land development work along with the following : a) Allocation of land for use of different purpose. b) Quantity and rough cost Estimate for earth work-cutting/filling/leveling/surface dressing/plantation etc. c) Rough cost Estimate for sewerage and surface drainage d) Rough cost Estimate for road construction v) Overall benefit of the project vi) Conclusion and recommendation

3.	**MAP SHOULD BE SUBMITED ALONGWITH THE REPORT** i) **Master** plan of the township (Plan shown only :Division of sectors/Streets.) ii) Topographical map of the project(Prepared at Annual Survey training camp) Proposed Street map /Proposed Water supply and sewerage and surface drains map/Proposed Electrification map.
Text Books:- Nil.	
Reference books :- Nil	
Suggested List of Laboratory Experiments :- Nil	
Suggested List of Assignments/Tutorial :- Nil	

Name of the Course : SURVEY ENGINEERING (FIELD SURVEY PRACTICES – III)	
Course code : SE / S4 / P4 / FSP3	**Semester : FIFTH**
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 : 6 hrs/week	External Assessment : 50 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 basic knowledge of Surveying.

Contents : (Practical)	
Sl. No.	**Assignments**
1.	Survey with total station
2.	Comparative map and boundary demarcation
3.	Capacity of a river
4.	Map of a river
5.	Setting out of simple curve by ordinates or offsets from long chord.
6.	Setting out of simple curve by offsets from chords produced.

7.	Setting out of simple curve by deflection angles (Rankine's method).
8.	Setting out of simple curve by two theodolites method.

Text Books:-

Sl. No.	Titles of the Book	Name of Authors	Name of the Publisher
1	Surveying and Levelling (Vol. 2)	**S. K. Duggal**	TATA MC GRAW-HILL
2	Higher Surveying	**Dr. A.M.Chandra**	NEW AGE INTERNATIONAL PUBLISHERS
3	Surveying (Vol. 3)	**Dr. K. R. Arora**	STANDARD BOOK HOUSE
4	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

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)** Municipal Engineering Mining Technology Town & Country Planning Transmission Line Survey	3	3	1	-	10	20	30	70	-	-	100
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

	satellites, SPOT, IRS satellites, IRS-1C/1D etc. 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. 2.5 HARDWAREAND 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. 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, resembling or interpolation of gray values, nearest neighborhood, bilinear interpolation, Cubic convolution, Registration or image to image rectification etc. 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. 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. 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. 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. 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		

	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.		

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, Filt 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.** Homotropal & Antitropal 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-ecconomic 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.	**2.3 A REPORT ON ROAD PROJECT** **(**Report prepared should include information related to the following):- 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.	**2.4 MAPS SHOULD BE SUBMITTED ALONGWITH THE PROJECT** 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	