Syllabus For AMIN A Bhumi Sahayak

Course Name	AMIN _A Bhumi Sahayak,V2
Course Code	STC-CON/AABS/0807,V2
Occupation	Bhumi Sahayak / Junior Amin / Amin (Apprentice)
Job Description	1. Cadastral survey of a village using required survey instruments. 2. Boundary demarcation of plots applying land department procedures. 3 Survey of a proposed industrial site using Theodolite or other survey instruments. 4. Conducting project work on land acquisition of a proposed road/ industrial project. 5. Supervision of any construction or renovation work of Municipality / Corporation / Panchayat at execution stage (specifically project consists boundary demarcation, land acquisition if any etc.) 6. Preparation of contour of an area using leveling instruments. 7 To acquired knowledge on different official work related to land acquisition or boundary demarcation or cadastral survey in which land rules ,regulation, land laws and conventional procedure of cadastral survey follows under state government land department
Anticipated Volume of Training	720 Hrs (Theory- 150 Hrs + Practical- 360 Hrs, Employability Skill – 60 Hrs, OJT – 150 Hrs)
Trainees' Entry Qualification	Class 8 Pass + ITI (2 Yrs) with 2 years experience, OR Class 10 Pass + ITI (1Yr) after class 10 with 1 year experience, OR Class 10 Pass + ITI (2 yrs) after class 10, OR Class 10 Pass with 2 years experience, OR Class 10 Pass and pursing continuous regular schooling, OR 3 years diploma after class 10 or Class 12 Pass with 6 months experience, OR Previous Relevant Qualification of NSQF Level 3 with 2 yrs experience.
Trainers Qualification	B.E./B.TECH IN CIVIL ENGINEERING OR CONSTRUCTION ENGINEERING OR/ DIPLOMA IN CIVIL ENGINEERING OR/DIPLOMA IN SURVEY ENGINEERING OR/DIPLOMA IN MINE SURVEYING OR/DIPLOMA IN GIS AND GPS OR/ ITI IN SURVEYOR. 2 YEARS FOR B.E./B.TECH / 5 YEARS FOR DIPLOMA / 8 YEARS FOR ITI

Structure of Course:

Module No.	Outcome	Theory (Hrs)	Practical (Hrs)	OJT (Hrs)	Total (Hrs)
1	Perform Basic Technical Drafting work along with draw conventional signs and symbols used in surveying.	20	70		90
2	Perform site survey using chain/tape and prepare a site plan.	40	80		120
3	Demonstrate Land Surveys (Revenue Survey) – area measurement.	20	70		90
4	Perform cross staff survey an calculate area of a plot.	20	40		60
5	Conduct closed Traverse survey with chain & compass.	20	40		60
6	Perform theodolite survey and traverse survey by theodolite and prepare a site map	10	20		30
7	Conduct plane table survey by different methods	10	20		30
8	Conduct Leveling using dumpy level, leveling staff etc.	10	20		30
9	**OJT**			150	150
10	**Employability skill**	60			60
	TOTAL	**210**	**360**	**150**	**720**

SYLLABUS:

Module No.1: Perform Basic Technical Drafting work along with draw conventional signs and symbols used in surveying.

Outcome: Perform Basic Technical Drafting work along with draw conventional signs and symbols used in surveying.

Theory Content:

1.1 Drawing Instruments,
1.2 Types of line.
1.3 Scale-plane and diagonal scale, R.F,
1.4 Geometrical construction (Polygon),
1.5 Orthographic projection - plan, elevation, side view of any object or structure.
1.6 Symbols used in Amin survey.
1.7 Introduction/Definition,
1.8 Responsibility of an AMIN,
1.9 Introduction to Mouza Map.
1.10 Agency under an AMIN recruited,
1.11 AMIN as Entrepreneur.

Practical Content:

1. Scale; Types of scale used in civil engineering drafting work.
2. R.F.
3. Conversion of plot length into actual length in the field.
4. Draw plan, elevation, side view and sectional view of civil engineering objects.
5. Draw different symbols used in Amin survey.
6. Study of various rules and regulations related to Land Survey (cadastral survey) of various Govt. agencies.
7. Study of Mouza Map.

Module No. 2: Perform site survey using chain/tape and prepare a site plan.

Outcome: Perform site survey using chain/tape and prepare a site plan.

Theory Content:

1 Direct measurement: Pacing, odometer, chaining.
2 Instruments for measuring distance: General concept of metric surveying chain, Gunter's chain, Revenue chain, Engineers' chain
3 Tapes- General concept of different Tapes i.e. Cloth or linen tape, metric woven metallic tape, metric steel tape, invar tape, synthetic tapes etc.
4 Instruments for marking station: General concept of pegs, ranging rods, offset rod, laths whites, plumb bob etc.
5 Ranging out survey lines- Procedure of direct and indirect ranging using ranging rod and .line ranger.
6 Chaining a line
7 Errors in length due to incorrect chaining.
8 Electronic distance measurement (EDM):
9 Definition of plane Surveying,
10 Classification of Surveying based on 1) nature of field : land surveys, marine or navigation surveys(only definition), astronomical surveys (only definition) 2) methods employed 3) instrument use,
11. **Sub-division of land surveys:** Topographical surveys, Cadastral surveys, City surveys and Engineering surveys,
12. Sub division of engineering survey: Reconnaissance surveys, preliminary surveys, and location surveys.
13. Methods of locating a point: Rectangular coordinates, Polar coordinates. control point.
14. Measurements: Linear and Angular measurements,
15. Units of measurement- Basic units of length, Basic units of area, Basic units of volume, conversion of basic units.
16. Working of the surveyor: Field work, office work, care and adjustments of instruments

Practical Content:

1.Demonstration of instruments for direct measurement like, odometer, chains, Electronic Measuring Wheels,
Digital Tape Measures etc.
2.Demostration and use of ranging rod, arrow, pegs, Cloth or linen tape, metric woven metallic tape, metric steel tape, invar tape, synthetic tapes etc.
3. Chaining a line by chain and tape.
4. Handling of electronic instruments for measuring distance.
5. Identification of different type of instruments and accessories used in field surveying.

6. Storage of all the instruments and tools related to Surveying.

7.Maintenance of all the instruments and tools related to surveying

Module No. 3: Demonstrate Land Surveys (Revenue Survey) – area measurement.

Outcome: Demonstrate Land Surveys (Revenue Survey) – area measurement.

Theory Content:

1 Objective of land surveys
2 preliminary principle of land surveys.
3 Name of Government agency conducting land surveys.
4 Definition of cadastral survey.

5 Purpose/aim/use/objective of cadastral survey.
6 Terms related to Cadastral Survey- Quadrilateral , Shikmi line, Partal Line , Goda, Chanda, Dhai, Khaka,Thoka line, Trijunction Pillar, Alamat Khatian,Khanapuri, Bhujarat, J.L Number, RS Map, C.S Map, L.R Map, Parcha.
7 General principles of measurement of an area of regular and irregular boundary
i. Using instruments (Acre Comb, Planimeter, Digital Planimeter etc.)
ii) Mathematical calculation.(division into squares, the mid-ordinate rule, the average ordinate rule, the trapezoidal rule and Simpson's rule.)
8 Balancing of error in area measurement. (Ground measurement and Sheet measurement)

Practical Content:

1. Conducting Cadastral Survey of a small area.
2. Finding area of a plot from Mouza map using Acre Comb, Planimeter, Digital Planimeter and Mathematical relations.
3. Balancing of error in area measurement.

Module No. 4: Perform cross staff survey an calculate area of a plot.

Outcome: Perform cross staff survey an calculate area of a plot.

Theory Content:

1 Definition and Objective of traverse.
2 Classification of traverse: closed, open traverse
3 Methods of traverse based on instrument use: (A).By Chain and compass, (B). By plane table, (C) By theodolite.
4: Field work: Reconnaissance; marking stations; reference sketches; running survey lines.
5 Cross staff survey:
a) Objective;
b) General principles: i) right angled triangle method ii) trapezoid method.
c) instrument: i)Cross staff ii) chain / tape iii) ranging rods iv)plumb bob v) Peg vi) arrow
d) offsets
e) Booking field notes in field book
f) Plotting the boundary of a field or plot and determination of its area.

Practical Content:

1. Identify different types of metric chain and their components.
2. Measure sides of a field with chain and tape and enter it in field book.
3. Conduct field work for selection of a suitable traverse.
4. Draw index map, reference sketches in field book.
5. Taking offset and enter it in a field book of any plot so that it can be divided into number of right angle triangle and trapezium.
4. Plotting the boundary of a field or plot and determination of its area after cross staff survey.

Module No. 5: Conduct closed Traverse survey with chain & compass.

Outcome: Conduct closed Traverse survey with chain & compass.

Theory Content:

1 Principles of chain and compass surveying,
2 instruments for setting out right angles: Setting right angle by tape.
3 classification of traverse: closed traverse, open traverse.
4 The prismatic compass; method of using prismatic compass. Surveyor compass
5 Bearings of lines; true meridians; magnetic meridian; arbitrary meridian; designation of baring(WCB,RB); fore bearing, back bearing; calculation of included angle; local attraction;

8 Traversing with the chain and compass.
9 plotting of traverse.

Practical Content:

1. Identify different types of compass and their components
2. Setting compass over the stations A and B respectively of a line AB and measure fore bearing and back bearing of the line AB.
3. Conduct a closed traverse survey with the chain and compass. Record the same in field book. Plot the traverse with appropriate scale.

Module No.6: Perform theodolite survey and traverse survey by theodolite and prepare a site map.

Outcome: Perform theodolite survey and traverse survey by theodolite and prepare a site map.

Theory Content:

1. Introduction to theodolite and its uses.
2. Types of theodolite and components of transit theodolite.
3.Terms related to theodolite, relationship between fundamental lines of theodolite
4. Temporary adjustment of theodolite
5. Methods of measurement of horizontal and vertical angle.
6. Prolongation of a straight line.
7. Theodolite traversing by included angle method
8. Theodolite traverse survey plotting: computing consecutive and independent coordinate and plotting of traverse.

Practical Content:

1. Identify components of transit theodolite.
2. Setting compass over the stations 'O' find horizontal angle AOB between two station A and B.
3. Determine height of a building.
4. Conduct a closed traverse survey with the of transit theodolite. Record the same in field book. Plot the traverse with suitable scale.

Module No. 7: Conduct plane table survey by different methods.

Outcome: Conduct plane table survey by different methods.

Theory Content:

1. Objective
2. Accessories used for plate table survey and their uses.
3. Temporary adjustment (setting) of plane table over a station.
4. Methods of plane table survey-radiation, intersection, traversing, resection method.

Practical Content:

1. Identification of different type of instruments and accessories used in plane table surveying.
2. Temporary adjustment (setting) of plane table over a station.
3. Conduct plane table survey of any plot of land with few details such as pond, tree etc. by radiation, intersection, traversing method

Module No. 8: Conduct Leveling using dumpy level, leveling staff etc.

Outcome: Conduct Leveling using dumpy level, leveling staff etc.

Theory Content:

1. Terms related to levelling. Types of bench mark
2. The basic components of dumpy level.
3. Types and description of levelling staff.
4. Temporary adjustment of dumpy level.
6. Methods of levelling: simple levelling; differential levelling or fly levelling; profile levelling, cross section levelling; reciprocal levelling.
7. Level book
8. Methods of calculation of reduced level.
9. Introduction to Auto Level

Practical Content:

1. Demonstration of the basic components of dumpy level and levelling staff.
2. Setting and temporary adjustment of dumpy level over a station before taking reading.
3. Conduct 300m profile and cross section levelling with necessary entry in level book, calculate and plotting of R.L.

Module No.	Outcome	Assessment Criteria
1	Perform Basic Technical Drafting work along with draw conventional signs and symbols used in surveying.	1. Describe the responsibility of an AMIN 2. List different drawing instrument for AMIN 3.List and draw different types of line used in civil/drafting work, 4. Draw plane figures used in field of work by applying drawing instruments with proper scale. 5.Construct plain scale and diagonal scale 6.Explain R.F of a scale 7. Construct plan, elevation, side view of any object or structure 8. Cartographic symbols used in Aminship (i.e. ALAMAT)
2	Perform site survey using chain/tape and prepare a site plan.	1. Summarize Instruments for measuring distance, marking station. 2. Explain Ranging out survey lines, 3. Describe different parts of chain. 4. differentiate between chains 5. Measure distance by chain and Tapes. 6. Identify and eliminate different types of errors in Chain survey. 7. Explain the method of ranging of a line. 8. understand the basic concept of EDM. 9.Define plane Surveying, 10.Classify surveying based on a) nature of field b) methods employed c) instrument use 11. Summarize uses of surveys, principles of surveying, 12 Explain methods of locating a point 13. Explain Linear and Angular measurements
3	Demonstrate Land Surveys (Revenue Survey) – area measurement.	1. Define land surveying and their classification. 2. define cadastral surveying. Objective of cadastral survey. 3. Define terms related to cadastral survey. 4. calculate the area of regular and irregular plot from mouza map using instruments, graphical method, mathematics. 5. Balance of error in area measurement. (Ground measurement and Sheet \measurement)
4	Perform cross staff survey an calculate area of a plot.	1. Understand the basic reference frame of Surveying. 2. Classify traverse. 3. Conduct reconnaissance survey, select stations for any traverse 4. Do field book entry. 5. Objective of cross staff survey.

Module No.	Outcome	Assessment Criteria
		6. Describe different types of instruments required for cross staff survey. 7. Calculate area of a plot of cross staff survey.
5	Conduct closed Traverse survey with chain & compass.	1.Expalin principles of chain and compass surveying, 2 Identify the instruments required for setting out right angles. 3. Describe angle measuring instruments. 4. Explain different types of bearing. 5. Calculate included angles of any closed traverse. 6. Conduct a closed traverse survey with the chain and compass. Record the same in field book. Plot the traverse with appropriate scale.
6	Explains use of theodolite	1. Differentiate between transit and non-transit theodolite. 2. Identify main parts of transit theodolite. 3. Define important terms related to transit theodolite. 4. Do temporary adjustment of theodolite. 5. Describe the uses of theodolite. 6. Measure horizontal and vertical angle. 7. Prolong a straight line. 8. Conduct theodolite traversing by included angle method.
7	Conduct plane table survey by different methods	1. describe the objective of plane table survey 2. List the accessories used for plate table survey and their uses. 3. Set plane table over a station. 4.Conduct plane table survey by radiation, intersection, traversing method
8	Conduct Leveling using dumpy level, leveling staff etc.	1. Define terms related to levelling. 2. Describe the basic components of dumpy level. 3 Describe types of levelling staff. 4. Read levelling staff. 5. Do temporary adjustment of dumpy level. 6. Conduct differential levelling or fly levelling; profile levelling, cross section levelling. 7. Make entry in level book. 8. Calculate reduced level. 9. Develop concept of Auto Level

List of Tools, Equipment & materials needed for 30 Trainees:

A. Essential

Sl. No	Instrument / Equipment	Number
1	Metric Chain (20m and 30m)	2 nos each
2	Engineering Chain	1
3	Gunter Chain	2
4	Tape (5m, 15m, 30m)	5 no each
5	Cross staff	5
6	Prismatic Compass	5
7	Auto Level with accessories	5
8	Dumpy Level with accessories	2
8	Levelling Staff	5
9	Transit Vernier Theodolite with accessories	5
10	Plane Table with accessories	5 set
11	Acre comb	5

12	Planimeter	5
13	Ranging Rod	10
14	Wooden mallet	5
15	Wooden peg	50
16	Arrow	20
17	Sample Cadastral Map	1
18	Offset rod	5
19	Optical square	5
20	Leaser distance measure	3

B. Desirable

Sl. No	Instrument / Equipment	Number
1	Digital Theodolite with all accessories	1 set
2	Digital Planimeter	1
3	Total Station with all accessories	1 set

Marks Distribution

Outcome	Outcome Code	Total Th Marks	Total Pr. Marks
Perform Basic Technical Drafting work along with draw conventional signs and symbols used in surveying.	CON/0807/OC1	20	90
Perform site survey using chain/tape and prepare a site plan.	CON/0807/OC2	40	100
Demonstrate Land Surveys (Revenue Survey) – area measurement.	CON/0807/OC3	20	90
Perform cross staff survey an calculate area of a plot.	CON/0807/OC4	20	50
Conduct closed Traverse survey with chain & compass.	CON/0807/OC5	20	50
Perform theodolite survey and traverse survey by theodolite and prepare a site map	CON/0807/OC6	10	40
Conduct plane table survey by different methods	CON/0807/OC7	10	40
Conduct Leveling using dumpy level, leveling staff etc.	CON/0807/OC8	10	40
Work in real job situation with special emphasis on basic safety and hazards in this domain (OJT).	CON/0807/OC9	0	300
Employability Skill-60 Hrs	DGT/VSQ/N0102	50	0