सूक्ष्म, लघु एवं मध्यम उद्यम मंत्रालय
DEVELOPMENT COMMISSIONER
MINISTRY OF MICRO, SMALL & MEDIUM ENTERPRISES
MSME TECHNOLOGY CENTRE

MODEL CURRICULUM

Qualification Name:

Front Line Junior Supervisor (Construction)

Qualification Code:

Version: 2.0

NSQF Level: 4.5

Model Curriculum Version: 2.0

Submitted By:

MSME TECHNOLOGY CENTRE

O/o DC MSME, Ministry of Micro, Small and Medium Enterprises

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COURSES / MODULE TEMPLATE

NOS /Module: Sketch Architectural drawings, section view,3D View.

NOS /Module Code: MSME/ADSDA/01

Outcomes:

After completion of course Student should be able to:

- Apply safe working practices.
- Making geometrical figures using drawing instruments.
- Free hand sketching of building plan elevations & views.
- Sectional views showing orthographic, isometric & oblique projection.
- Exploring the branch of civil engineering.
- Interpret & use company terminology & technical communication.
- Understanding the fundamental of surveying field work.
- 3d&2d drafting of building structure.
- Animation of interior and exterior design of building.
- Making image for modern building in PNG/ JPG format &creation rendering lighting.

Theory Hours: 30 **Practical Hours: 60** **Theory Marks: - 0** **Practical Marks: 100**

Unit No.	Unit Name	Unit level outcomes	Contents (chapters/topics)	PR hours	PR Marks
UNIT-I	2D & 3D sketches	• Calculate the coordinate system in manually & using by AutoCAD software. • Purpose of drawing, Types of drawing. Different types of lines & uses, projection & types of projection methods.	• Do exercises to develop drawing manually on drawing sheet. • Do unit conversation & make the plain scale, diagonal scale, Vernier scale, comparative scale and scale of chord. • Differentiate between 1st angle& 3rd angle projection. Draw orthographic views in 1st and 3rd angle projection method. • Identify different types of Stairs, Parts of stairs, Different sizes of doors and windows by using technical terms of door and window. • Identify the culverts, syphons, and bridges. Design PEB structure. • Calculate the coordinate system in manually & using by AutoCAD software. • Draw all the drawing & diagram by using software. • Make practice some command option, arc& TEXT option by using In all the drawing & diagram.	10	65

			• Identify function &use of Hatching, gradient, Layer in drawing or building plan.		
UNIT-II	Dimensioning	After completion of unit Student should be able to • Set the dimension, scale& modify, increase /decrease the object by using scale factor and create the interior design in the building drawing.	• Scale tools and thread representation. • Dimension and attribute text. • Ellipse, arc, and poly line. • Arc, aligned text, spline, & dimension setting. • Dimension style and dimensional tolerance & limits. • UCS, WCS • Layout plan, Detail drawing of R.C.C structure • soak pit, septic tank & building model in 3D. Demonstrate Plotting and Printing.	20	20
UNIT-III	3D Modeling	After completion of unit Student should be able to • 3D toolbar & 3D views. Create 3D • Drawing & modeling in building 3D plan by using modeling toolbar.	• Isometric view by wire frame. • Extrude, Revolve, Union, and Subtraction & Intersection, sweep, and extrude face. • Solid primitives, solid editing command (move face, offset face). • Assembly drawing & attribute text. • Annotation, block & w-block & leader. • Extension files used (.dwt, .scr, and slide). • Primitives used in solid modeling.	30	15

COURSES / MODULE TEMPLATE

NOS /Module: Analyze concrete & steel structures, applying properties & loads. Design exterior/interior, Render with 3Ds MAX & Revit and create color/shadow in Photoshop.

NOS /Module Code: MSME/ADSDA/02

Outcomes:

After completion of course Student should be able to:

- Demonstrate STAAD- PRO, & its uses. Do frame structure, steel structure & applying properties, loads, shear force and bending moment. Do design of steel, /concreate structure & staad foundation.
- Explain about 3ds max. Transfer plan from auto cad to 3ds max, using some standard object, light, camera, material & doing rendering, and animation.
- Explain basic introduction of Photoshop, object transfer, layer creation, creating view port, modify to object using some tool bars, color & shadow creation of object and image creation for modern building.
- Architectural modeling using Revit, set up units & element properties, annotating, detailing, presentation tools, printing, export/import.

Theory Hours: 30 Practical Hours:-240 HRS Theory Marks: 0 Practical Marks: -100

Unit No.	Unit Name	Unit level outcomes	Contents (chapters/topics)	PR hours	PR Marks
UNIT-I	STAAD Pro.	• Demonstrate STAAD-PRO, & its uses. • Do frame structure, steel structure & applying properties, loads, shear force and bending moment. • Do design of steel, /concreate structure & staad foundation.	• **Introduction –** ▪ Explain briefly introduction to structural design &analysis, brief introduction about RCC structure. ▪ Doing frame structure ▪ Calculating coordinate points, properties of building. ▪ Theory of Strength of Materials • **plane & space frame structure –** ▪ Briefly describe about load, types & uses of load, calculation of dead load, live load& floor load ▪ Working with design and analysis of building &, steel structure, preparation of RCC report. ▪ Applying load (wind load, seismic load, floor load, live load, dead load) using by water tank, tower,	80	35

			truss& multi stored building. • **Design of beam and column:-** ▪ Design of beam and column, file transfer, concrete design, steel design, slab design, shear force /bending moment, solve some error ▪ Using I.S code to define concrete design, steel & transfer to file from AutoCAD to STAAD PRO through DXF file. ▪ Staad Foundation		
UNIT-II	**3ds MAX & Work in Photoshop**	• Explain about 3ds max. Transfer plan from auto cad to 3ds max, using some standard object, light, camera, material & doing rendering, and animation. • Explain basic introduction of Photoshop, object transfer, layer creation, creating view port, modify to object using some tool bars, color & shadow creation of object and image creation for modern building.	• **Introducing 3ds max** ▪ Exploring the features of 3ds max ▪ Installing Autodesk 3ds max ▪ User interface and setting preferences ▪ Using the help feature of 3dsmax and exiting 3ds max • **Working with primitives, modifiers, and reactors in 3ds max** ▪ Understanding the project workflow& geometry primitives ▪ Working with object, grids, pivot point, layers, splines, modifiers, reactors. ▪ Exploring modeling concepts and NURBS modeling ▪ Working with editable poly objects ▪ Exploring subdivision modeling • **Animation, inverse kinematics, and character studio& particle systems and space warps:** ▪ Understanding animation concepts and exploring kinematics ▪ Using the inverse kinematics methods and working with biped ▪ Understanding character studio and physique ▪ Working crowd systems & working with particle systems and space warps	80	35

			• **Exploring rendering** ▪ Introducing the scanline render, ray tracing, advanced lighting, & mental ray rendering ▪ Working with VUE file render ▪ Using texture baking ▪ Exploring the rendered frame window • **Work in Photoshop** ▪ Introducing software & configuring photoshop workspaces and preferences ▪ Launching Photoshop, exploring the interface, using screen modes, opening an image using adobe bridge ▪ Selecting a workspace, creating and deleting a workspaces ▪ Working with panels in Photoshop, ▪ Shortcuts keys & menu settings, customizing preferences ▪ Drawing painting, and retouching tools ▪ Setting the current foreground and background colors ▪ Filling a selection with the current foreground color ▪ Using the content – aware feature & exploring drawing tools, painting tools, retouching tools ▪ Automation, 3d, and printing in Photoshop ▪ Working with actions & automate commands ▪ Exploring 3d model from 2d image using 3d panel & editing 3d shape ▪ Creating an animation, editing an animation& optimizing the animation for web, and printing the image in Photoshop		

UNIT-III	REVIT ARCH.	• architectural modeling using Revit, set up units & element properties, annotating, detailing, presentation tools, printing, export/import	• **Introducing Revit** ▪ Understanding the basic concepts and principles of Revit ▪ Installing Autodesk Revit ▪ Understanding the user interface & features ▪ Describe different types of Revit files & their file extensions. ▪ Demonstrate the Revit Architecture & its elements ▪ Create a new project & Work with project view, Unit setup. • **Working with project, work planes, building components, Modify tools** ▪ Create levels, Work with level, elevation & Floor plan ▪ Create different types of walls, specify different parameters. ▪ Describe Modify tools, match type tool, Grouping objects. ▪ Add doors, windows. Place different building components. ▪ Work with edit profile mode of wall by sketching elements. ▪ Working with floor, roof, ceiling. Describe opening tools. ▪ Working with different types of stair, ramp and railing. • **Working with Model in-place elements, Material, site design** ▪ Use of Model in-place elements. Work with different tool like extrude, blend, sweep, revolve, swept blend, void. ▪ Setting color for wall, add material & texture to different building elements, components & Model in-place elements. ▪ about sectioning libraries, basic knowledge of building. ▪ Create Topo surface. Describe modify site tools. ▪ Add plants and entourage in building model. • **Annotation and detailing, different views, room & area** ▪ Working with annotation & detailing, dimension. ▪ Creating text notes	80	30

			▪ Creating grids ▪ Working with labels ▪ Create section view, callout view, plan view, elevation, sheet ▪ Working with room & area, color scheme & color fill legend • **Rendering basics and Import & Export** ▪ Understanding the rendering work flow, using lights, and creating a lighting fixture. ▪ Adding a lighting fixture to a building model & setting the light source ▪ In rendering use different lighting scheme and their settings ▪ Create Walkthrough and export Walkthrough video. ▪ Export the different views in pdf, image file format. ▪ Export Revit file & different views to AutoCAD and 3Ds Max. ▪ Import CAD, link different files using manage links. • **Revit Structure & MEP basics** ▪ Demonstrate the Revit Structure & its elements ▪ Create a project using Structure template and create column, beam, slab, foundation. Add Rebar to structure. ▪ Create Revit MEP project & demonstrate the elements.		

NOS /Module: Use of building materials and their function and construction procedure.

NOS /Module Code: MSME/ADSDA/03

Outcomes:

After completion of course Student should be able to

- Students are able to understand the property , use , advantage and disadvantage of different material used in construction
- Students are able to understand the component of building with their function
- Students are able to understand construction procedure of different components

THEORY HOURS: -30 PRACTICAL HOURS: 0 THEORY MARKS: - 100 PRACTICAL MARKS:

Unit No.	Unit Name	Unit level outcomes	Contents (chapters/topics)	TH hours	TH Marks
UNIT-I	**Stone**	After completion of unit Student should be able to • About rocks, stones, characteristics and selection with using various works.	• **Introduction** • **All Classification of Rocks,** • **use of stone** • **quality of good stone** • **characteristics of stone** • **selection of stone in various work**	2	10

UNIT-II	**Bricks**	After completion of unit Student should be able to
		• Details of bricks, types of bricks, quality, bonding of bricks as per code.
			• **Introduction**
			• **Composition**
			• **Dimensions confirming is-code-1077:1992**
			• **Classification**
			  ○ **Unburnt or sun-dried bricks**
			  ○ **Burnt bricks and types**
			  ○ **Classification confirming is-code-1077:1992**
			• **Quality of good bricks**
			• **Special type of bricks**
			• **Introduction of brick test**
			• **Introduction to brick bonding confirming is-code-2212:1991**
				3	15

UNIT-III	**Cement**	After completion of unit Student should be able to • About types of cement with all details with different types of test.	• **Introduction** • **Ingredients& Function** • **Type of cement &advantages-disadvantages** • **ordinary Portland cement (OPC)** • **Portland Pozzolana cement (PPC)** • **acid resistance Cement** • **Colored Cement:** • **Blast Furnace Cement** • **Expanding cement.** • **High Alumina Cement.** • **Bogue's compound** • **Hydration of cement**	5	20
UNIT-IV	**Sand**	After completion of unit Student should be able to • Types and characteristics of sand	• **Sources Of Sand-Pit, River, Sea Sand** • **Characteristics of sand** • **Bulking Of Sand** • **Grading Of Sand**	5	10
UNIT-V	**Coarse Aggregate**	After completion of unit Student should be able to • As per code types of aggregates	• **Introduction** • **Particle shape & texture-rounded, irregular, flaky, angular IS-383-2016**	3	5
UNIT-VI	**Mortar**	After completion of unit Student should be able to • Types ,using of mortar and applications.	• **Introduction** • **Ingredients& Function** • **Properties of good mortar & Uses:** • **Types of Mortar on the bases of –** • **Bulk density, Kinds of binding material, Nature of application** • **Precautions in using mortar**	2	10
UNIT-VII	**Concrete**	After completion of unit Student should be able to • About ingredients, gradation, curing of concrete	• **Introduction** • **Ingredients& Function** • **Properties of different type concrete** • **Gradation of concrete** • **Preparation of concrete mix-hand mixing, machine mixing**	4	15

			• **Curing of concrete**		
UNIT-VIII	**Timber**	After completion of unit Student should be able to • About timbers , characteristics.	• **Introduction** • **Uses of timber:** • **Classification of trees** • **Structure of tree:** • **Defects in timber due to- conversion, fungi, natural forces, insects** • **characteristics of good timber**	3	15
UNIT-IX	**Bitumen**	After completion of unit Student should be able to • about bitumen , test of bitumen, types of bitumen	• **Introduction** • **Flash and Fire point of bitumen** • **Introduction of all types of Bitumen -Penetration Grade Bitumen, Oxidized Bitumen Grades, Cut Back Bitumen, Bitumen Emulsion, Polymer Modified Bitumen**	3	5

COURSES / MODULE TEMPLATE

NOS /Module: Intro to surveying, leveling, types, GPS/DGPS function & uses.

NOS /Module Code: MSME/ADSDA/04

Outcomes:

After completion of course Student should be able to

- **Definition of surveying, classification based upon the nature of the field survey.**
- **Horizontal & vertical plane, datum surface or line bench marks etc.**
- **Introducing parts of the instruments**
- **Coarse centering & fine centering**
- **Focusing the cross hairs, focusing the target point& measure the points.**
- **Stake out ground height, stake out height difference, and stake out distance, leveling & data management.**
- **Performing by long section & cross section method create road profile**
- **Procedure of centering with the optical plummet eyepiece**
- **Procedure of centering with the leaser of plummet**
- **Procedure of leveling with the circle level.**
- **Job selection, job details, job deletion**
- **Station orientation, observation of points**
- **Practice of OBS& DATA EDIT DATA**
- **After transferring process data, Create Topo map in AutoCAD software.**
- **Function of GPS/DGPS instrument& uses of GPS/DGPS.**
- **How the GPS/DGPS working in survey**
- **What are the common errors of GPS/DGPS survey**
- **Advantages & disadvantages**
- **Limitation of GPS/DGPS instrument**
- **Procedure of GPS/DGPS device & practice.**
- **Find out coordinate of any point by Static Survey and creating topo map by PPK Survey/RTK Survey.**

THEORY HOURS: -30 PRACTICAL HOURS: 30 THEORY MARKS: - PRACTICAL MARKS: 100

Unit No.	Unit Name	Unit level outcomes	Contents (chapters/topics)	PR hours	PR Marks
Unit-I	**Levelling**	At the end of this Unit the student should be able to: • Do leveling & surveying • Perform different operations using auto level and calculate various parameters. • Perform rise and fall method, error correction	• Definition of surveying, classification based upon the nature of the field survey. • Horizontal & vertical plane, datum surface or line bench marks etc. • Introducing parts of the instruments • Coarse centering & fine centering • Focusing the cross hairs, focusing the target point& measure the points. • Stake out ground height, stake out height difference, and stake	15	40

			out distance, leveling & data management. Performing by long section & cross section method create road profile		
Unit-II	**Total station**	At the end of this Unit the student should be able to: • Do operational panel & other plants of the instruments with the help of machine in field. • Do centering with the optical plummet eye piece as per procedure with the leaser plummet, do leveling of the circle level with the help of machine. • Do Job selection, Job Details, Job detection, Station orientation of points by help of machine • Shift the instrument from one station to another station & Download Data.	• Introduction of surveying & leveling, and types of surveying. • Introducing operational panel & other parts of the instrument, • Safety instruction • Procedure of centering with the optical plummet eyepiece • Procedure of centering with the leaser of plummet • Procedure of leveling with the circle level. • Job selection, job details, job deletion • Station orientation, observation of points • Practice of OBS& DATA EDIT DATA • After transferring process data, Create Topo map in AutoCAD software.	10	40
Unit-III	**GPS & DGPS**	At the end of this Unit the student should be able to: • Identify main segments used for navigation & Differentiate between the mobile GPS & GPS instrument. • Measure the point to point distance using GPS device through satellite. • Do the GPS work in survey. Solve the common errors of GPS survey & Principles of GPS device. • Identify main segments used for navigation & Differentiate	• Introducing the GPS/DGPS & what is GPS/DGPS. • Introduction to main segments uses for navigation • Difference between the mobile & GPS/DGPS instrument. • Introducing to GPS/DGPS device& parts of GPS/DGPS instrument • Function of GPS/DGPS instrument& uses of GPS/DGPS. • How the GPS/DGPS working in survey • What are the common errors of GPS/DGPS survey • Advantages & disadvantages • Limitation of GPS/DGPS instrument • Procedure of GPS/DGPS device & practice. • Find out coordinate of any point by Static Survey and creating	5	20

		between the mobile GPS, GPS instrument, DGPS. • Measure the point to point distance using DGPS device through satellite. • Do the DGPS work in survey. Solve the common errors of DGPS survey & Principles of DGPS device. • Process data in computer, transfer format to CSV, DWG & DXF with Specter link software.	topo map by PPK Survey/RTK Survey.		

COURSES / MODULE TEMPLATE

NOS /Module: Estimation of building with rate analysis of civil works.

NOS /Module Code: MSME/ADSDA/05

Outcomes:

After completion of course Student should be able to

- Understand the preparation of an Abstract Estimate and detailed estimate of building.
- Determine earth work quantity for building.
- Understand preparation of Notice inviting tender document for bidding, tendering process and examining rate analysis of civil works.
- Design bar bending schedule for reinforcement works, identify specifications and tendering process for contracts and create various tender documents for bidding purpose.
- Evaluate the valuation of building for different specifications.
- Understand Estimation calculation using spreadsheet.

THEORY HOURS: 30 PRACTICAL HOURS: - THEORY MARKS: 100 PRACTICAL MARKS: -

Unit No.	Unit Name	Unit level outcomes	Contents (chapters/topics)	TH hours	Marks
Unit I	**GENERAL METHODOLOGY OF BUILDING ESTIMATE**	After completion of unit Student should be able to • Understand and write simple sentence. • Acquire listening & writing Skills • Understand Technical Writing • Write Letter, Job Application and Reports	**General items of work in building – Standard units principles of working out quantities for detailed and abstract estimates – Approximate method of estimating; Detailed estimates of buildings.**	**5**	**15**
Unit II	**QUANTITY ESTIMATE**	After completion of unit Student should be able to • Understand the process of team formation • Understand Group Dynamics • Manage Team Performance & Team Conflicts	• **Brick calculation - No. of brick required for area, Cement Mortar quantity; Plaster work** • **Earth work calculation** • **Paint Quantity Calculation** • **Tiles calculation- No. of tiles & Cement Mortar quantity**.	**5**	**15**

Unit III	**METHOD OF MEASUREMENT OF WORKS**	After completion of unit Student should be able to • Understand the concept of human Values and Civic Rights • Understand Operator Ethics and Social experimentation • Understand Environmental Ethics.	• **General Rules , Units of Works.** • **Earthworks; Brickworks; Formworks; Steel works; Painting; Concrete Works, confirming IS 1200**	**5**	**15**
Unit IV	**RATE ANALYSIS**	After completion of unit Student should be able to • Acquire confidence building attitude. • Acquire Personal goal setting.	• **Rate Analysis- Working out data for various items of work over head** **- follow CPWD or PWD manual.** • **Rate analysis - Contingent charges.**	**5**	**15**
Unit V	**REINFORCEMENT BAR BENDING**	After completion of unit Student should be able to • Understand the process of setting up a business • Acquire the knowledge of preparing project report • Understand the processes of Bank loan • Understand about various govt. schemes for Start-up	• **Reinforcement bar bending and bar requirement schedules (Beam, Column, Slab, Foundation).** • **Hook & Bend; Development length;**	**5**	**15**
Unit VI	**CONTRACTS & VALUATION**	After completion of unit Student should be able to • Understand the process of setting up a business • Acquire the knowledge of preparing project report • Understand the processes of Bank loan Understand about various govt. schemes for Start-up	• **Contract & Types of contracts; Tender & Tender Document; Work order; Earnest Money; Security Money** • **Purpose of Valuation of a buildings; Scrap Value; Salvage Value; Market value; Book value; Depreciation; Distressed value**	**3**	**15**

Unit VII	**ESTIMATION AND COSTING USING MS OFFICE**	After completion of unit Student should be able to • Understand the process of setting up a business • Acquire the knowledge of preparing project report • Understand the processes of Bank loan Understand about various govt. schemes for Start-up	• **Make different types of bill (R.A. – 1, R.A. -2) format using MS Word.** • **Estimation calculation using MS Excel.** • **Prepared a power point presentation on Estimation & costing using MS Power Point**	**2**	**10**

COURSES / MODULE TEMPLATE

NOS /Module: Employability Skills

NOS /Module Code: MSME/ES/02

THEORY HOURS: 60 PRACTICAL HOURS: - THEORY MARKS: 100 PRACTICAL MARKS: -

Refer Standard Curriculum developed by NCVET. (60-hours-MC-Employability-Skills_v4-DGT (1).pdf)