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: 1.0

NSQF Level: 4.5

Model Curriculum Version: 1.0

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.

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**	80	30

			▪ Working with annotation & detailing, dimension. ▪ Creating text notes		

			▪ 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.		

COURSES / MODULE TEMPLATE

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 iscode-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 & texturerounded, 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 mixhand 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** □ **toconversion, 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 out distance, leveling & data management. Performing by long section & cross section method create road profile	15	40
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)