CCEK – NSQF ALIGNED PROGRAM

COURSE SYLLABUS

FOR

Quantity Surveying and Valuation

CCEK - NATIONAL SKILL DEVELOPMENT TRAINING PROGRAM

Quantity Surveying and Valuation

CCEK – NSDC course package covers the following Qualification Packs and leads to the following NSDC certifications. The students who successfully completed the course programs are entitled to get NSDC certification after undergoing the assessment process of NSDC as per the rules and regulations stipulated by NSDC from time to time.

SL. NO.	QUALIFICATIONS PACK	QUALIFICATIONS PACK CODE	NSQF LEVEL
1	**Surveyor** **Brief Job Description**: The individual will be able to impart theoretical instructions, demonstrate practical skills, evaluate and grade trainees of Surveyor trades in ITIs/ Vocational Training Institutes, industrial workshops, etc.	**CON/Q0902**	**5.5**

COURSE DETAILS

Quantity Surveying and Valuation

EXAMINATION DETAILS

COURSE NAME	COURSE CODE	ELIGIBILITY	DURATION
Quantity Surveying and Valuation	G06	Diploma/ degree	430

SL. NO.	EXAM	EXAM CODE	MAXIMUM MARK	INTERNAL	TOTAL MARK
THEORY PAPERS					
1	Construction Management and Accounts	T001	100	50	150
PRACTICAL PAPERS					
1	Rate Analysis Practical	L001	100	50	150
TOTAL MARKS					
1	Total Examination Marks (Theory Online + Practical Examination)				200
2	Total Internal Marks				100
3	**Total Marks (Total Internal Marks + Total Examination Marks)**				**300**

Quantity Surveying and Valuation

INTERNAL MARK CRITERIA FOR EACH

SL NO.	MODULE	MODULE CODE	MAXIMUM MARK	INTERNAL MARK	TOTAL MARK
1	Construction Management and Accounts	T001	100	50	150
2	Rate Analysis Practical	L001	100	50	150
	TOTAL		200	100	300

ATTENDANCE	GENERAL PERFORMANCE	INTERNAL EXAMINATIONS/ PROJECTS/ ASSIGNMENTS	TOTAL MARKS
5	5	40	50

COURSE SYLLABUS

FOR

Quantity Surveying and Valuation

COURSE	Quantity Surveying and Valuation	
TOTAL MARKS	Mark: 300	Internal Mark: 100
TOTAL HOURS	430 Hrs	

DEFENITION OF CREDIT

1 Credit	15Hrs Theory/ 30Hrs Practical
Skill Components	60 – 70 % of Total Credit

MODULES INCLUDED IN THIS SUBJECT

SL NO	MODULE NAME	CREDIT BREAKUP
1	Module 1: Bridge Module	**.5**
2	Module 2: Carry out temporary adjustment of survey instruments by standard methods	**1**
3	Module 3: Conduct linear measurements using survey instruments and tools	**1.5**
4	Module 4: Carry out levelling and cross sectioning survey	**3**
5	Module 5: Carry out setting out works	**3**
6	Module 6: Carry out topographic survey	**3**
7	Module 7: Plan, arrange and manage resources for execution of relevant work	**.5**
8	Module 8: Manage safety and healthy workplace	**.5**
9	Module 9: Employability Skills	**1**
	Total	**14**

Training Outcomes

- Discuss the concepts and procedures for carrying out temporary adjustments for various survey instruments.
- Explain the different types of linear measurements and their procedures.
- Discuss the standard procedure for conducting linear measurements with total station.
- Explain the concept and principles of levelling, different types of levelling, and their application.
- Discuss the standard procedure for conducting levelling works.
- Discuss about the setting out techniques, limitations and sequences.
- Discuss the concept of topographic survey, its importance and different methods of conducting topographic survey using modern and conventional instruments.
- Explain the planning of various work activities as per the given target, timelines and resources.
- Discuss about the optimum utilization of the manpower and other resources.
- Discuss about maintaining healthy and safe working environment at the construction site.
- Identify risks and other emergency situations at the workplace and respond accordingly to minimize risk.
- Explain methods of sanitization and infection control measures followed at the construction site.

MODULES

Module 1: Bridge Module

THEORY

- Describe the role and responsibilities of a Surveyor.
- Define the personal attributes required in Surveying occupation.
- Explain the future possible progression and career development options of a Surveyor

Module 2: Carry out temporary adjustment of survey instruments by standard methods

THEORY

- Explain the errors/ faults in the surveying instruments.
- Discuss the concepts and procedures for carrying out temporary adjustments for various instruments like
    - dumpy level,
    - auto level,
    - theodolite,
    - transit level,
    - total station etc.
- Elaborate the concepts and types of permanent adjustments, its purpose and importance.
- Discuss about the difference between temporary and permanent adjustments.

PRACTICAL

- Check for any visible damage or dirt
- Use a soft cloth to remove dust and debris. Ensure that lenses and mirrors are clean.
- Use the built-in bubble level or electronic level to ensure the instrument is level. Adjust the leveling screws until the bubble is centered
- Verify that the optical plummet or laser plummet is aligned correctly. Adjust if necessary.
- Set the instrument on a known point.
- Sight a reference point and set the horizontal circle to zero.
- Rotate the instrument 180 degrees and sight the same reference point. The reading should be 180 degrees. If not, adjust the horizontal circle.
- Sight a point at the same height as the instrument.
- Ensure the vertical circle reads zero or 90 degrees, depending on the instrument's configuration.
- Rotate the instrument vertically and check the reading on another point. Adjust if necessary.
- Sight a distant point, reverse the telescope, and sight the same point. If the reading is off, adjust the horizontal and vertical collimation screws.

- Ensure the compensator is functioning correctly by slightly tilting the instrument and observing the automatic correction.
- Focus the instrument on a leveling rod at different distances to ensure the crosshairs are centered.
- Center the bubble using the leveling screws and rotate the instrument 180 degrees. The bubble should remain centered. Adjust if necessary.
- Take multiple measurements of known points to verify the instrument's accuracy after adjustment.
- Document any adjustments made and the final readings for future reference.
- Set up a temporary control point with known coordinates.
- Use the adjusted instrument to measure distances and angles to other known points.
- Compare the measured values with known values to ensure accuracy.

Module 3: Conduct linear measurements using survey instruments and tools

THEORY

- Brief about the selection of tools and instruments based upon the work requirements.
- Describe different types of errors in the linear measurements, their causes and impact on project measurement.
- Elaborate the methods to avoid errors in linear measurements.
- Discuss about the various difficulties that faced during survey work.
- Explain the different types of linear measurements and their procedures.
- Brief about the different hand signals, their interpretations and applications.
- Describe the procedure for entering data into field books for various types of liner measurements including symbols and representations.
- Elaborate about selection of station points, and ideal conditions for selection of station points.
- Explain the standard procedure for conducting linear measurements with total station.
- Define the concept of as-built drawings and procedure for conducting measurements, recording, and plotting as built measurements.

PRACTICAL

- Choose the appropriate survey instruments (e.g., tape measures, total stations, theodolites, laser distance meters).
- Ensure that all instruments are calibrated and in good working condition.
- Set up baseline or control points that will serve as references for measurements.
- Use markers or stakes to indicate measurement points on the ground.
- For short distances, use a tape measure. Stretch the tape tightly between two points and record the measurement.
- For longer distances, set up a total station or theodolite. Ensure it is level and properly oriented. Measure distances and angles to determine linear distances.
- Point the laser at the target point and record the displayed distance.
- Record all measurements in a field book or digital device. Include details such as date, time, instrument used, and weather conditions.

- Make rough sketches showing measurement points and distances for better understanding and future reference.
- Re-measure critical distances to ensure accuracy.
- Make necessary adjustments if discrepancies are found.
- Use the recorded measurements to calculate the coordinates of points.
- Create maps or plans based on the measurements. Use software tools for more precise and detailed mapping.
- Organize all data, sketches, and calculations into a comprehensive report.
- Review the report for accuracy and completeness before submission or further use.

Module 4: Carry out levelling and cross sectioning survey

THEORY

- Define the scope of the survey and decide the station points and staff locations.
- Explain the concept and principles of levelling, different types of levelling, and their application.
- Elaboration of computation of Reduced levels through rise and fall method and height of collimation method.
- Discuss the standard procedure for conducting levelling works.
- Describe the importance of levelling in various sub sectors of the construction industry.
- Identify errors, their source and impact, and rectifying them while performing the survey works.
- Explain the procedure for laying slopes and gradients for roads, bridges, pipelines, canals etc.
- Elaborate the errors in slope alignment and their implications, identification, and rectifications.
- Brief the procedures for making entries in the field book and make necessary calculations.

PRACTICAL

- obtain accurate elevation data for the land which is crucial for designing foundations, roads and other structures
- plan the grading (cutting and filling) necessary for construction projects to ensure proper drainage and stability.
- design the alignment and profiles of roads, including the calculation of volumes for cut and fill for accurate cross- sectional data
- Identify areas prone to flood by determining the topography and water flow patterns.
- Assist in creating detailed site plans for residential, commercial and industrial developments.
- Verify that construction activities are being carried out according to design specifications and standards.

Module 5: Carry out setting out works

THEORY

- Discuss about the specifications, quality requirements and operational details required for setting out works.
- Brief about the setting out techniques and Sequences.
- Elaborate the application and requirements of line, level and plumb in construction projects.
- Explain the basic mathematical techniques associated with setting out method.
- Discuss about the site isolation and traffic control responsibilities and authorities.
- State the types, characteristics, technical capabilities and limitations of setting out devices.

PRACTICAL

- Study the construction plans and gather all necessary equipment such as theodolites, total stations, GPS devices, tapes, and markers.
- Identify and mark primary reference points (benchmarks) on the site, often using permanent markers.
- Use surveying equipment to transfer the coordinates from the design to the ground
- mark the positions on the ground using stakes, pegs, or paint, indicating where the foundations, walls, and other structural elements will be located.
- check the accuracy of the setting out by comparing the physical marks with the design plans and making any necessary adjustments
- Record all measurements and marks in a detailed log for future reference and verification during the construction process

Module 6: Carry out topographic survey

THEORY

- Discuss the concept of topographic survey, its importance and different methods of conducting topographic survey using modern and conventional instruments.
- Describe the application of topographic survey in various sectors.
- Discuss the concepts of contours, calculations required for plotting contours,
- Explain the Interpretation and importance of contours.
- Brief the knowledge of scale and key while plotting a contour map
- Discuss to plot the collected data to represent topography of the area in required scale
- Explain the different methods of computing levels, angles, bearing and distances using modern and conventional instruments

PRACTICAL

- determine the relative locations of points (places) on the earth's surface by measuring horizontal distances, differences in elevation and directions
- select a scale in advance; this determines the plottable error
- work from the most accurate to the least accurate methods
- orient each survey, preferably with respect to true north
- the first stage of surveying is always establishing horizontal and vertical control: the distance, direction and difference in elevation between key fixed points
- establish a survey plan that includes checks on accuracy, e.g. redundant points, pacing of measured distances, surveying between fixed positions, etc.
- calculate horizontal distance by using tachymetry method
- calculate horizontal distance by using measuring slope distance method
- calculate difference in elevation by leveling with a level telescope and a stadia rod
- calculate difference in elevation by measuring a vertical angle and a slope distance (height is the product of the distance and sine of the angle)
- calculate the direction by means of horizontal angle measured with a compass, precise measuring devices use Vernier scales
- perform geodetic surveying to measure the shape of earth and error
- conduct the adjustments for closure error

Module 7: Plan, arrange and manage resources for execution of relevant work

THEORY

- Explain the process of planning of the given tasks and activities relevant to the trade/job role within defined scope and duration.
- Explain the procedure adopted for prioritizing an activity and sequencing of activities.
- Explain basic concept of labor productivity and work productivity.
- Interpret the Construction drawing for the technical details.
- Discuss the methods to calculate the quantum of the given work.
- Estimate the quantities of tools, accessories, materials and manpower required as per the given work.
- State the standard working practices for the given work.
- Discuss the methods and techniques for briefing team members on the matter of the given work.
- Describe the methods to evaluate the progress and quality of the ongoing works.
- Explain the importance of daily productivity report and attendance register.
- Discuss on the optimized use of the available resources.
- Explain the process to produce 2D drawings using auto-cad software.

PRACTICAL

- Demonstrate the process of arranging the work as per priority
- Describe how to interpret construction drawing
- Describe standard working practices for the given work
- Perform the optimization of available resources
- Elucidate the 2D, 3D drawings on different civil engineering software
- Demonstrate ways to determine the work requirements corresponding to the task (drawings/schedules/instructions/me thodology), safety, tools and equipment prior to the commencement of the task.
- Show how to prepare the work areas in coordination with team members.
- Demonstrate the procedures for organizing the required materials, tools and tackles required for the task.
- Demonstrate how to use resources in an optimum manner to avoid any unnecessary wastage.
- Demonstrate the practices to use tools, tackles and equipment carefully to avoid damage.
- Show how to clean and organise the workplace after completion of tasks.

Module 8: Manage safety and healthy workplace

THEORY

- Explain the various types of hazards at construction site and procedures to respond in case of any emergency or accidents.
- Discuss about the various personal protective equipment (PPE) used during various construction works.
- Describe the safe work practices to be followed while performing task.
- Discuss the methods to ensure the workplace safety and good health of workers.
- Explain the safe ways for using tools, tackles, equipment and materials as specified by Environment, Health and Safety (EHS) department.
- Discuss the policies, guidelines and other requirements related to workplace safety as per EHS department/ government norms.
- Describe the various types of infectious disease, their symptoms and control, at the construction site.
- Discuss the medical guidelines, national legislation, local policies and protocols regarding spread of infectious disease.

PRACTICAL

- Demonstrate how to follow emergency and evacuation procedures in case of accidents, fires, or natural calamities.
- Show how to operate different types of fire extinguishers corresponding to various

- types of fires as per EHS guidelines.
- Demonstrate the use of appropriate Personal Protective Equipment (PPE) as per work requirements for Head Protection, Ear Protection, Fall Protection, Foot Protection, Face and Eye Protection, Hand and Body Protection, and Respiratory Protection (if required).
- Demonstrate how to check and install all safety equipment as per standard guidelines.
- Show how to collect, segregate and deposit construction waste into appropriate containers based on their toxicity or hazardous nature.
- Show how to clean and disinfect all materials, tools and supplies before and after use.

Module 9: Employability Skills

THEORY

Introduction to Employability Skills
- Discuss the importance of Employability Skills in meeting the job requirements

Constitutional values - Citizenship
- Explain constitutional values, civic rights, duties, citizenship, responsibility towards society etc. that are required to be followed to become a responsible citizen.
- Show how to practice different environmentally sustainable practices

Becoming a Professional in the 21st Century
- Discuss 21st-century skills.
- Display a positive attitude, self-motivation, problem-solving, time management skills and continuous learning mindset in different situations.

Basic English Skills
- Use appropriate basic English sentences/phrases while speaking

Communication Skills
- Demonstrate how to communicate in a well-mannered way with others.
- Demonstrate working with others in a team

Diversity & Inclusion
- Show how to conduct oneself appropriately with all genders and PwD
- Discuss the significance of reporting sexual harassment issues in time

Financial and Legal Literacy
- Discuss the significance of using financial products and services safely and securely.
- Explain the importance of managing expenses, income, and savings.
- Explain the significance of approaching the concerned authorities in time for any exploitation as per legal rights and laws

Essential Digital Skills

- Show how to operate digital devices and use the associated applications and features, safely and securely
- Discuss the significance of using the internet for browsing, and accessing social media platforms, safely and securely

Entrepreneurship

- Discuss the need for identifying opportunities for potential business, sources for arranging money and potential legal and financial challenges

Customer Service

- Differentiate between types of customers
- Explain the significance of identifying customer needs and addressing them
- Discuss the significance of maintaining hygiene and dressing appropriately

Getting ready for Apprenticeship & Jobs

- Create a biodata
- Use various sources to search and apply for jobs
- Discuss the significance of dressing up neatly and maintaining hygiene for an interview
- Discuss how to search and register for apprenticeship opportunities