National Occupational Standards

Basics of High-Performance Liquid Chromatography (HPLC) Analysis

Unit Code: LFS/N0361

Version: 1.0

NSQF Level: 5.5

Life Sciences Sector Skill Development Council || # 14, Rear 2nd Floor, Palam Marg, Vasant Vihar New Delhi-110057 || email:ANSHUL.SAXENA@LSSSDC.IN

Description

This standard is about analyzing samples using a High-Performance Liquid Chromatography (HPLC) system. Learner will be expected to be able to set up the system for the analysis, ensure that the samples are ready for analysis, load and run all samples, obtaining all necessary results. He/She will be expected to initiate and complete tasks and procedures exercising a degree of autonomy and judgement within specified parameters. This person will also be aware of the limits of authority and the procedures to be followed.

Scope

The scope covers the following :

- Introduction of High-Performance Liquid Chromatography (HPLC)
- Basics of HPLC analysis

Elements and Performance Criteria

Introduction of High-Performance Liquid Chromatography (HPLC)

To be competent, the user/individual on the job must be able to:

PC1. Perform a demonstration of setting up and operating an HPLC system.

PC2. Perform a presentation on the various applications and significance of HPLC in analytical chemistry.

PC3. Prepare examples or case studies illustrating real-world applications of HPLC for better understanding

Basics of HPLC analysis

To be competent, the user/individual on the job must be able to:

PC4. Perform sample preparation techniques such as dilution or extraction as required.

PC5. Prepare standard solutions and controls for use during analysis.

PC6. Ensure the accuracy and reproducibility of sample preparation techniques.

PC7. Ensure the instrument is calibrated and ready for use.

PC8. Follow protocol for sample analysis, including sequence and timing.

PC9. Perform sample injection and chromatographic analysis using HPLC instrumentation.

PC10. Ensure proper optimization of chromatographic conditions for efficient separation.

PC11. Ensure compliance with standard operating procedures including safety procedure and method requirements.

PC12. Prepare documentation templates for recording analysis results and observations.

PC13. Perform data analysis, including peak identification and quantification.

PC14. • communicate the required information about the work done, to authorized people, in accordance with departmental and organizational
• procedures

Knowledge and Understanding (KU)

The individual on the job needs to know and understand:

KU1. concepts of organic chemistry and analytical chemistry

KU2. fundamental principles of HPLC, including the separation mechanism and detection methods

KU3. components of an HPLC system and their functions, such as the pump, injector, column, detector, and data system

KU4. significance of HPLC in analytical chemistry and its various applications in different industries.

KU5. importance of cleaning and maintaining HPLC instruments to ensure reliable and reproducible results

KU6. Sample preparation techniques, such as dilution and extraction, and their importance in obtaining accurate results

KU7. preparation of standard solutions and controls for use during HPLC analysis, ensuring accuracy and reliability.

KU8. Protocols for sample analysis, including the sequence of samples, timing, and adherence to method requirements

KU9. Data analysis techniques, including peak identification and quantification, for interpretation and reporting of results

Generic Skills (GS)

User/individual on the job needs to know how to:

GS1. use written communication skills to record information accurately in compliance with ALCOA principles as per SOP and GMP guidelines in the English language

GS2. use reading and comprehension skills to read the various coding systems, instructions, guidelines, procedures, rules, and signages

GS3. use listening skills to understand the instructions, escalation matrix, procedures to be followed and to seek clarifications.

GS4. use verbal communication skills to interact with teammates, researchers, assistants, lab in charge and cross functional teams.

GS5. use team-building skills while dealing with teammates and while managing the difficult/stressful or emotional situations at work.

GS6. apply problem-solving skills to find solutions for workflow-related difficulties and for troubleshooting.

GS7. apply planning and organizing skills to plan and organize tools and material required to fulfil own work requirements in timely manner.

GS8. apply critical thinking skills to analyze and identify when to report an issue/concern to the lab in charge and when to deal with a colleague individually, depending on the type of concern

GS9. apply analytical skills to observe results of analysis and to identify OOS/ OOT/ deviations/ abnormal incidents.

GS10. apply customer centricity to remain compliant with data integrity rules, GMP/GLP guidelines and to evaluate impact of wrongdoings.

Assessment Criteria

Assessment Criteria for Outcomes	Theory Marks	Practical Marks	Project Marks	Viva Marks
Introduction of High-Performance Liquid Chromatography (HPLC)	**10**	**10**	**-**	**-**
PC1. Perform a demonstration of setting up and operating an HPLC system.	-	-	-	-
PC2. Perform a presentation on the various applications and significance of HPLC in analytical chemistry.	-	-	-	-
PC3. Prepare examples or case studies illustrating real-world applications of HPLC for better understanding	-	-	-	-
Basics of HPLC analysis	**20**	**40**	**20**	**-**
PC4. Perform sample preparation techniques such as dilution or extraction as required.	-	-	-	-
PC5. Prepare standard solutions and controls for use during analysis.	-	-	-	-
PC6. Ensure the accuracy and reproducibility of sample preparation techniques.	-	-	-	-
PC7. Ensure the instrument is calibrated and ready for use.	-	-	-	-
PC8. Follow protocol for sample analysis, including sequence and timing.	-	-	-	-
PC9. Perform sample injection and chromatographic analysis using HPLC instrumentation.	-	-	-	-
PC10. Ensure proper optimization of chromatographic conditions for efficient separation.	-	-	-	-
PC11. Ensure compliance with standard operating procedures including safety procedure and method requirements.	-	-	-	-
PC12. Prepare documentation templates for recording analysis results and observations.	-	-	-	-

Assessment Criteria for Outcomes	Theory Marks	Practical Marks	Project Marks	Viva Marks
PC13. Perform data analysis, including peak identification and quantification.	-	-	-	-
PC14. • communicate the required information about the work done, to authorized people, in accordance with departmental and organizational • procedures	-	-	-	-
NOS Total	**30**	**50**	**20**	**-**

National Occupational Standards (NOS) Parameters

NOS Code	LFS/N0361
NOS Name	Basics of High-Performance Liquid Chromatography (HPLC) Analysis
Sector	Life Sciences
Sub-Sector	
Occupation	Quality
NSQF Level	5.5
Credits	3.00
Minimum Job Entry Age	NA
Minimum Educational Qualification & Experience	Completed 3 year UG degree (in Chemistry/ Microbiology/Marine science/ Biotechnology/ Biochemistry/ Botany/ Zoology / Pharma/ Chemical Engineering/ Food Technology/ any other relevant science field involving Chemical or Biological analysis) OR Pursuing first year of 2-year PG program after completing 3 year UG degree (Microbiology/ Marine science/ Biotechnology/ Chemistry/ Biochemistry/ Botany/ Zoology/ Pharma/ Chemical Engineering/ Food Technology/ any other relevant science field involving Chemical or Biological analysis)
Version	1.0
Last Reviewed Date	22/10/2024
Next Review Date	22/10/2027
NSQC Clearance Date	22/10/2024
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NQR Version	1.0
CCN Category	1