

Annex 1

Description of Requirements

Context of the Requirement	<p>a) The Service Provider must ensure tight collaboration with UNDP prior to conduct the program.</p> <p>b) The concept of the Training Course, detailed schedule and deliverables shall be agreed upon in advance. The detailed Training course schedule will be discussed between the service provider and UNDP prior to the call of the contract.</p> <p>c) The training location is distributed within Kirkuk governorate; the service providers are required to conduct the training in the agreed location.</p> <p>d) The service provider must contact all participants and advise on the location, date, and time of the training session in order to ensure their availability. The UNDP Technical Training Experts (TTE's) will supply the service provider with a list of participants, including their contact numbers and work descriptions.</p> <p>e) The service provider must contact all participants in advance to make sure the participants bring their own laptops if it is necessary for the course.</p> <p>f) The Training program shall be delivered in Arabic or/and English language for the purpose of the lectures and materials.</p> <p>g) The training program materials shall be subject to the agreed format with UNDP.</p> <p>h) The service provider must evaluate the participants prior to start of the training course and at the end of the course as well through pre-test and post-test</p> <p>i) The lecturer is required to adjust the training course based on the level of trainees.</p> <p>j) Training program shall be conducted in an interactive way, bringing real-life examples.</p> <p>k) Training should be dynamic and hands-on practice, with a focus on participation and interaction. The service provider shall provide the participants with Pre-assignment, exercises, and group projects to help participants to follow up and practice more.</p> <p>l) The training of the whole package should be illustrated through real example projects and videos.</p> <p>m) The Trainer should allocate half an hour to review the topics covered in the previous day</p> <p>n) The service provider must be presented at targeted location by 8 am and start giving the lectures by 9 am and finish by 3 pm.</p> <p>o) A course book, hard copy, of the training course materials especially (IEA course) should be handed over to every single participant, so that they can review the lectures at home and in the future.</p> <p>p) The participants are government employees who work on the infrastructure projects implemented in areas liberated from ISIS. Updated and detailed information will be provided to the service provider upon their request.</p> <p>q) For the training program mentioned below, the number of participants could change from 10% to 20 %</p> <p>r) The service provider must allocate two persons for the following duties:</p> <ul style="list-style-type: none"> • Preparing an attendance list for recording the participants along with their signatures on daily basis • Contact the directorates' focal points and participants in advance to advice on the course name, time, location and any other important information related to the program. • Sending daily and weekly reports to the UNDP.
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Implementing Partner of UNDP	N/A
Brief Description of the Required Services ¹	<p>The main goal is to get a technical and financial proposal from an experienced capacity building service provider to conduct The Environment and related Instruments Training Package. The program is intended to improve the capacity of government personnel in various directorates of Kirkuk Province. The key target groups are official employees who work on infrastructure projects in Kirkuk governorate, including Environment Directorate in particular.</p> <p>Annex A contains the training Program package with a specific curriculum and expected learning outcomes for each training course in the package.</p>
List and Description of Expected Outputs to be Delivered	<p>The Service provider shall submit the following items:</p> <ol style="list-style-type: none"> 1. A database (Live Google sheet) to maintain participants' information as follows: participants' full name, their Directorates, Phone numbers, Email addresses and Genders. 2. A course book (Booklet) which includes comprehensive training materials regarding the training course, course objectives, and expected learning outcomes based on the training set in Annex A. 3. A comprehensive final report for each Training Course is required, which includes: <ul style="list-style-type: none"> • Course summary, • List of participants, major discussions during the courses, observations, recommendations. • Trainee's Feedback. 4. UNDP will review and approve the final report for each Training Course. <ul style="list-style-type: none"> • The training company or individuals submits all reports to UNDP/ TTEs in English. • The Training Courses including lectures and materials shall be delivered in Arabic or/ and English
Person to Supervise the Work/Performance of the Service Provider	UNDP's Technical Training Experts (TTEs)
Frequency of Reporting	<i>As indicated in the ToR attached as Annex 4</i>
Progress Reporting Requirements	(As indicated in the ToR attached)
Location of work	(As indicated in the ToR attached)
Expected duration of work	5 working days and five hours per day
Target start date	November 01, 2022,

¹ A detailed TOR may be attached if the information listed in this Annex is not sufficient to fully describe the nature of the work and other details of the requirements.

Latest completion date	(As indicated in the ToR attached)
Travels Expected	(As indicated in the ToR attached)
Special Security Requirements	(As indicated in the ToR attached)
Facilities to be Provided by UNDP (i.e., must be excluded from Price Proposal)	(As indicated in the ToR attached)
Implementation Schedule indicating breakdown and timing of activities/sub-activities	<input checked="" type="checkbox"/> Required <input type="checkbox"/> Not Required
Names and curriculum vitae of individuals who will be involved in completing the services	<input checked="" type="checkbox"/> Required <input type="checkbox"/> Not Required
Currency of Proposal	<input checked="" type="checkbox"/> United States Dollars
Validity Period of Proposals (Counting for the last day of submission of quotes)	<input checked="" type="checkbox"/> 120 days In exceptional circumstances, UNDP may request the Proposer to extend the validity of the Proposal beyond what has been initially indicated in this RFP. The Proposal shall then confirm the extension in writing, without any modification whatsoever on the Proposal.
Partial Quotes	<input checked="" type="checkbox"/> Not permitted
Payment Terms ²	Payment is done in three installements upon completing the deliverables.
Person(s) to review/inspect/ approve outputs/completed services and authorize the disbursement of payment	UNDP's Technical Training Experts (TTEs)

² UNDP preference is not to pay any amount in advance upon signing of contract. If the Service Provider strictly requires payment in advance, it will be limited only up to 20% of the total price quoted. For any higher percentage, or any amount advanced exceeding \$30,000, UNDP shall require the Service Provider to submit a bank guarantee or bank cheque payable to UNDP, in the same amount as the payment advanced by UNDP to the Service Provider.

<p>Allowable Manner of Submitting Proposals</p>	<p><input checked="" type="checkbox"/> Online bidding in E-Tendering module. Date and Time: As specified in the system (note that the time zone indicated in the system in New York Time zone).</p> <p>PLEASE NOTE: - Date and time visible on the main screen of the event (on the E-Tendering portal) will be final and prevail over any other closing time indicated elsewhere, in case they are different. Please also note that the bid closing time shown in the PDF file generated by the system is not accurate due to a technical glitch that we will resolve soon. The correct bid closing time is as indicated in the E-Tendering portal and system will not accept any bid after that time. It is the responsibility of the bidder to make sure bids are submitted within this deadline. UNDP will not accept any bid that is not submitted directly to the system. Try to submit your bid a day prior or well before the closing time. Do not wait until last minute. If you face any issue submitting your bid at the last minute, UNDP may not be able to assist.</p> <p>Note: for registration please refer to E-tendering instruction manual and FAQ.</p>
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Method of Submission	<p>Proposals must be submitted as follows:</p> <p><input checked="" type="checkbox"/> E-tendering</p> <ul style="list-style-type: none"> ▪ File Format: PDF and BOQ in PDF and EXCEL ▪ File names must be maximum 60 characters long and must not contain any letter or special character other than from Latin alphabet/keyboard. ▪ All files must be free of viruses and not corrupted. ▪ Max. File Size per transmission: 20MB <p>[For eTendering method, click the link https://etendering.partneragencies.org and insert Event ID information]</p> <ul style="list-style-type: none"> • Insert BU Code and Event ID number ▪ The Technical Proposal should be submitted separately from the Financial Proposal and must not contain any pricing information whatsoever on the services offered. <p>Financial Proposal Password:</p> <p>Password for financial proposal must not be provided to UNDP until requested by UNDP if the proposal is deemed technically qualified. Proposers will have 48 hours to respond to the request for password from UNDP. Proposers are advised to note their passwords in a secure place. Should UNDP be unable to open the file due to forgotten password(s), the Proposal shall be rejected.</p> <p>The bids submitted by email/post mail/hand shall not be accepted.</p> <p>While entering financial proposal in the e-tendering system, always mention your price as USD 1. Please do not mention the value of your financial proposal in e-tendering system. It should only be mentioned in the password protected file/attachment of financial submission form (form F and G). The proposal of those organizations who would reveal their financial proposal value in the e-tendering system will be considered as disqualified.</p> <p>Detailed instructions on how to submit, modify or cancel a bid in the eTendering system are provided in the eTendering system Bidder User Guide and Instructional videos available on this link: http://www.undp.org/content/undp/en/home/operations/procurement/business/procurement-notice/resources/</p>
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Joint Venture, Consortium or Association	<p>a. If the Bidder is a group of legal entities that will form or have formed a Joint Venture (JV), Consortium or Association for the Proposal, they shall confirm in their Proposal that : (i) they have designated one party to act as a lead entity, duly vested with authority to legally bind the members of the JV, Consortium or Association jointly and severally, which shall be evidenced by a duly notarized Agreement among the legal entities, and submitted with the Proposal; and (ii) if they are awarded the contract, the contract shall be entered into, by and between UNDP and the designated lead entity, who shall be acting for and on behalf of all the member entities comprising the joint venture.</p> <p>b. After the Deadline for Submission of Proposal, the lead entity identified to represent the JV, Consortium or Association shall not be altered without the prior written consent of UNDP.</p> <p>c. The lead entity and the member entities of the JV, Consortium or Association shall abide by the provisions of Clause 9 herein in respect of submitting only one proposal.</p> <p>d. The description of the organization of the JV, Consortium or Association must clearly define the expected role of each of the entity in the joint venture in delivering the requirements of the RFP, both in the Proposal and the JV, Consortium or Association Agreement. All entities that comprise the JV, Consortium or Association shall be subject to the eligibility and qualification assessment by UNDP.</p> <p>e. A JV, Consortium or Association in presenting its track record and experience should clearly differentiate between:</p> <p style="margin-left: 40px;">a) Those that were undertaken together by the JV, Consortium or Association; and</p> <p style="margin-left: 40px;">b) Those that were undertaken by the individual entities of the JV, Consortium or Association.</p> <p>f. Previous contracts completed by individual experts working privately but who are permanently or were temporarily associated with any of the member firms cannot be claimed as the experience of the JV, Consortium or Association or those of its members, but should only be claimed by the individual experts themselves in their presentation of their individual credentials.</p> <p>The Bidder (including the individual members of any Joint Venture) shall submit only one Proposal, either in its own name or as part of a Joint Venture.</p>
Other Information <i>[pls. specify]</i>	

	requirement specified in ToR (Experience in the Environment, chemistry, Geochemistry, Environmental chemistry, and or any close related field)		
3.1.2	The Trainer must have a minimum of a Master's degree in any of the following fields: Environment, chemistry, Geochemistry, Environmental chemistry, and or any closely related field.	100	
3.1.3	The Trainer(s) is/are required to have obtained a certificate in the relevant field which is explained in Annex A	50	
3.2	Instructors		50
3.2.1	Worked as an assistant lecturer for at least four years in one of the following specializations: Environment, chemistry, Geochemistry, Environmental chemistry, and or any closely related field.	50	
3.3	Managerial staff		50
3.3.1	Knowledge of the Region: years of experience in the region for 2 years – 35 points 3 -5 years – 45 points 6 years and above – 50 points	50	
	Total for the Management Structure and Key Personnel		400

[Date]

Annex 3

UNDP General Terms & Conditions for Contracts (Goods and/or Services)

[https://www.undp.org/content/dam/undp/library/corporate/Procurement/english/4.%20UNDP%20GTCs%20for%20de%20minimis%20Contracts%20\(Services%20only\)%20-%20Sept%202017.pdf](https://www.undp.org/content/dam/undp/library/corporate/Procurement/english/4.%20UNDP%20GTCs%20for%20de%20minimis%20Contracts%20(Services%20only)%20-%20Sept%202017.pdf)

Terms of Reference (ToR)

Capacity building Project for Kirkuk Governorate Directorates

(The Environmental Training Package)



United Nations Development Programme

Sep, 2022

Terms of Reference (ToR)

The Environmental Training Package

1 - Background

UNDP, in partnership with the Government of Iraq and the Global Coalition to Defeat ISIL, established the Funding Facility for Immediate Stabilization (FFIS) to quickly implement activities to stabilize newly liberated areas of Iraq in June 2015. FFIS is governed by a Steering Committee co-chaired by the Prime Minister's Office and the DSRSG/RC. The Funding Facility supports four sets of activities, each with a dedicated window. All activities support the needs identified by local authorities (Governors' offices, line departments, mayors), based on priorities identified at the local level through consultations. The Provincial Command Cells endorse the activities.

- A. Window One: Public works and light infrastructure rehabilitation.
- B. Window Two: Livelihoods support that jumpstart local economy and generate income for households, particularly families returning to their homes.
- C. Window Three: Capacity support for local governments, boosting their immediate response capacity to cope with the challenges arising during stabilization.
- D. Window Four: Community reconciliation initiatives that help local leaders and community groups promote social cohesion and dialogue.

UNDP/FFS has rehabilitated hundreds of millions of dollars' worth of public infrastructure, in close collaboration with the Kirkuk line directorates, including complicated works like hospitals, water treatment plants, and electrical substations. Under Window 3, to ensure the proper use and maintenance of these facilities, FFS intends to organize two 'sets' of technical training for the relevant Kirkuk line directorates:

- 1. General technical engineering training, including BoQ writing, drafting tender documents, designing structural, electrical, and mechanical elements, planning and managing maintenance works, on-site construction management, health and safety on-site, environmental management, use of IT, etc. This training will be given to all staff.
- 2. Specialized technical training for the operation and maintenance of specific equipment and systems such as water pumps, power transformers, hospital medical equipment, etc. This training will be for specialized directorate staff.

2 - Objective

The main goal is to get a technical and financial proposal from an experienced capacity building service provider to conduct The Environmental Training Package. The program is intended to improve the capacity of government personnel in various directorates of Kirkuk Province. The key target groups are official employees who work on infrastructure projects in Kirkuk governorate, including Environment Directorate in particular.

Annex A contains the training Program package with a specific curriculum and expected learning outcomes for each training course in the package.

3- Scope of Service

- a) The Service Provider must ensure tight collaboration with UNDP prior to conduct the program.
- b) The concept of the Training Course, detailed schedule and deliverables shall be agreed upon in advance. The detailed Training course schedule will be discussed between the service provider and UNDP prior to the call of the contract.
- c) The training location is distributed within Kirkuk governorate; the service providers are required to conduct the training in the agreed location.
- d) The service provider must contact all participants and advise on the location, date, and time of the training session in order to ensure their availability. The UNDP Technical Training Experts (TTE's) will supply the service provider with a list of participants, including their contact numbers and work descriptions.
- e) The service provider must contact all participants in advance to make sure the participants bring their own laptops if it is necessary for the course.
- f) The Training program shall be delivered in Arabic or/and English language for the purpose of the lectures and materials.
- g) The training program materials shall be subject to the agreed format with UNDP.
- h) The service provider must evaluate the participants prior to start of the training course and at the end of the course as well through pre-test and post-test
- i) The lecturer is required to adjust the training course based on the level of trainees.
- j) Training program shall be conducted in an interactive way, bringing real-life examples.
- k) Training should be dynamic and hands-on practice, with a focus on participation and interaction. The service provider shall provide the participants with Pre-assignment, exercises, and group projects to help participants to follow up and practice more.
- l) The training of the whole package should be illustrated through real example projects and videos.
- m) The Trainer should allocate half an hour to review the topics covered in the previous day
- n) The service provider must be presented at targeted location by 8 am and start giving the lectures by 9 am and finish by 3 pm.
- o) A course book, hard copy, of the training course materials especially (IEA course) should be handed over to every single participant, so that they can review the lectures at home and in the future.
- p) The participants are government employees who work on the infrastructure projects implemented in areas liberated from ISIS. Updated and detailed information will be provided to the service provider upon their request.

- q) For the training program mentioned below, the number of participants could change from 10% to 20 %
- r) The service provider must allocate two persons for the following duties:
- Preparing an attendance list for recording the participants along with their signatures on daily basis
 - Contact the directorates' focal points and participants in advance to advice on the course name, time, location and any other important information related to the program.
 - Sending daily and weekly reports to the UNDP.

4- Expected Deliverables

The Service provider shall submit the following items:

1. A database (Live Google sheet) to maintain participants' information as follows: participants' full name, their Directorates, Phone numbers, Email addresses and Genders.
2. A course book (Booklet) which includes comprehensive training materials regarding the training course, course objectives, and expected learning outcomes based on the training set in **Annex A**.
3. A comprehensive final report for each Training Course is required, which includes:
 - Course summary,
 - List of participants, major discussions during the courses, observations, recommendations.
 - Trainee's Feedback.
4. UNDP will review and approve the final report for each Training Course.
 - The training company or individuals submits all reports to UNDP/ TTEs in English.
 - The Training Courses including lectures and materials shall be delivered in Arabic or/ and English.

5- Qualifications of the Successful Service Provider

The training company (service provider) and trainers should meet the following minimum requirements:

The service provider must:

- Be a company, institute, NGO or educational firm specialized in Capacity Development Training.
- Have a proper management structure for planning, conducting assessments, evaluations, monitoring, and managing the implementation of the training course.
- Have worked with international organizations, financial institutions, and government agencies.
- Select the potential lecturers for the respective area specified in the proposal with their CVs. Only accepted lectures by UNDP will be finally included in the call of contract.
- Or in the case of assigning other trainers who are not listed in the proposal, prior approval is required by UNDP.
- The organization has a policy in place to protect participants from Gender-Based Violence (GBV) and Sexual Exploitation and Abuse (SEA).

The service provider offers trainers with following Qualifications and experiences:

- a) The Service provider offers trainers with the following Qualifications and experiences.
 - Minimum 7 years experience in the Environment, chemistry, Geochemistry, Environmental chemistry, and or any close related field.
 - PhD or MSc Academic Degree preferably, Environment, chemistry, Geochemistry, Environmental chemistry, and or any close related field.
 - Certification from Environmental chartered organization, the number of certifications shall be provided.
 - Experienced as a trainer in developing materials and delivering similar training courses
 - Certified trainers will be an asset.
- b) In the case of assigning other trainers who are not listed in the proposal, prior approval by UNDP is required.

6- Institutional Agreement

- a) UNDP's Technical Training Experts (TTEs) will be the focal points with service provider during the Service.
- b) The service provider shall consult with UNDP office earlier in case they need to contact the Governmental Directorates in Kirkuk during and before the Service.
- c) The service provider shall be responsible for obtaining Iraqi's visas for their trainers to attend the program.
- d) The service provider shall not execute the intellectual property rights on the submitted report and training materials used by UNDP.
- e) The training service provider shall maintain the proper documentation process, assessment, evaluation and quality of the training courses through a standard template.
- f) The UNDP is responsible for organizing:
 - The venue, location of all training courses
 - The logistics and corresponding equipment including only (a Data show, screen, whiteboard or flipchart).
 - Coffee break and lunch for **participants only**
 - Stationeries for participants only.

7- Submission of Proposals

The service providers are invited to apply. The applicants must submit the following information to demonstrate their qualifications:

- 1) In-depth technical proposal of applicants' understanding of Term of References (ToRs), proposed training methodology, service provider profile and CVs of the trainers.
- 2) In-depth implementation plan for all trainings listed in **Annex A**, which include but is not limited to:
 - A sufficient number of trainers that the service provider can assign for each training course along with other training support staff for effective training in terms of deliverable knowledge and reducing the

	<ul style="list-style-type: none"> • Methods of measurement. • Air pollution. • workplace air pollution • Outdoor air pollution • AIR QUALITY <p>2) second unit:</p> <ul style="list-style-type: none"> • Methods of protection and prevention of air pollution from dust • Methods of protection and prevention of air pollution • Harmful gases such as COX, SOX, NOX. • Noise pollution. • Noise pollution inside the work rooms • Noise pollution of the outdoor air • Noise measurement methods <p>3) Third unit:</p> <ul style="list-style-type: none"> • Methods of protection and prevention of noise in the work wards. • Radioactive pollution. • Radiation contamination inside work wards • Pollution of the outdoor air by radiation • Measurement methods for radiation • Methods of protection and protection from radiation in the work wards. • Rejected fire pollution. <p>4) Fourth unit:</p> <ul style="list-style-type: none"> • Contamination by rejected fires • Etiology • Control and measurement circuits • Ultrasound pollution. • Uses of ultrasound • Measurement and its applications • Prevention. <p>5) Fifth unit:</p> <ul style="list-style-type: none"> • Occupational diseases. • Diseases caused by pollution of industrial facilities • Etiology and prevention. • Diseases caused by pollution of petroleum installations • Etiology and prevention. • Diseases caused by COX, SOX, NOX air pollution in internal combustion machines. Diseases caused by noise pollution in work dust. • Diseases caused by radiation pollution <p>6) Sixth unit:</p> <ul style="list-style-type: none"> • Environmental legislation. • Air pollution. • The concept of environmental pollution. • The causes of pollution. • Air pollution with carbon dioxide and carbon monoxide. • Air pollution from automobile exhaust and lead.
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	<ul style="list-style-type: none"> • Energy as a source of pollution. • Air pollution with impurities. • Pollution with natural elements. • Water pollution and how to treat it. <p>7) Seventh unit:</p> <ul style="list-style-type: none"> • Chemical pollution and how to treat it. • Pollution by petroleum residues and how to treat it • Causes of oil contamination. • Resources of oil leaks. • The potentials and foundations for the success of protection methods. • Examples of some oil leaks accidents. • Establishing and developing the quality of the occupational health and safety management system. • The noise. • Electromagnetic pollution. • Acid rain. • The effect of air pollution on the ozone layer. • Pollution with sewage water and how to treat it. • Contamination by pesticides and fertilizers. <p>8) Eighth unit:</p> <ul style="list-style-type: none"> • Solid waste management and waste generation prevention. • Energy conservation and renewable energy. • Environmental information and monitoring systems. • Sewage. • Environmental awareness and education. • Protection of natural resources. • Management of coastal areas and marine pollution. <p>9) Ninth unit:</p> <ul style="list-style-type: none"> • Definition of waste and its types. • The basics of the process of retrieval and treatment of solid and liquid materials. • Returns. • The economics of the recall process. • Modern methods of handling solids and liquids. • Methods of recovery in the metallurgical and chemical industries. • Methods of recovery and treatment in sewage and water purification. • Methods of recovery and treatment in the petrochemical industries. • Practical applications <p>10) Tenth unit:</p> <ul style="list-style-type: none"> • Technological development in the field of dust and gas control. • Modern control systems for pollution control equipment. • Practical case studies in the field of diagnosing and treating pollution based on the experiences of companies in the field of environmental protection. • Techniques for monitoring dust emanating from petrochemical industry activities in the surrounding environment. • Measures to reduce dust emissions resulting from activities associated with the petrochemical industry, such as transportation, storage, packaging, etc. • Cleaner production and environmental management system in the petrochemical industry.
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	<ul style="list-style-type: none"> • Environmental Management Systems. • Prevent pollution. • Clean technologies
Learning Outcomes	<p>At the end of the course participants will be familiar with :</p> <ul style="list-style-type: none"> • Environmental planning and environmental impact assessment. • Implementation of environmental scanning skills. • Designing and managing safe landfills for hazardous waste. • Environmental impact assessment of municipal projects. • Management of crises and environmental disasters • Transferring international expertise, presenting the latest technologies in the field of environmental protection, and encouraging joint projects in the field of environmental management and environmentally friendly technology. • Energy conservation and efficiency, solid waste management, environmental systems management, and cleaner production in industry. It will address a number of topics, including the use of hydrogen as a clean fuel, solid waste management, and noise pollution, in addition to case studies related to cleaner production. • Applying the basics, types and economics of the recovery process and developing their abilities to know modern methods of treating solid and liquid waste materials. The participants are fully aware of pollution and how to treat it, as well as legislation for environmental protection.

Course name	Gas Chromatography Instrument
Software	GC-related software
Duration	5 working days and five hours per day
Course Description	<p>Gas chromatography (GC) is an analytical technique used to separate the chemical components of a sample mixture such as, soil, air or water and then detect them to determine their presence or absence and/or how much is present. These chemical components are usually organic molecules or gases. Gas chromatography is used in the analysis of:</p> <ul style="list-style-type: none"> • Air-borne pollutants • Performance-enhancing drugs in athlete's urine samples • Oil spills • Essential oils in perfume preparation
Course Content	<p>The instructor should give the following topics but not limited to:</p> <p>Unit One:</p> <ul style="list-style-type: none"> • Basics of chromatography • Carrier gas flow velocity and type • Column length and diameter • The type and concentration of the stationary phase used • Column theoretical plates • Column temperature (temperature controllers) • The type of backing material used and the size of its particles • Types of Chromatography Techniques (Detailed Explanation) • Separation process basics • Carrier gas and its types and how to choose the right gas • Carrier gas requirements • Flow regulators and flow meters

	<ul style="list-style-type: none"> • The oven <p>Unit Two:</p> <ul style="list-style-type: none"> • Main parts of gas chromatograph • Gases and plumbing • gas system • sample injection site • Column and its types • Liquid phase • Solid phase • Stationary phase • Solid phase • Detectors • Electron Sniper Detector (ECD) • Flame Ionization Detector (FID .) • Flame Photometric Detector (FPD) • Alkaline Flame Ionization Detector (AFID) • GC . Device Applications • Advantages of gas chromatography <p>Unit Three:</p> <ul style="list-style-type: none"> • Sample introduction • Sample collection and preservation • water samples • solid samples • oil samples • Sample preparation (aqueous, solid and oily) <p>Unit Four:</p> <ul style="list-style-type: none"> • sampling • liquid samples • liquid-liquid extraction • liquid-solid extraction • solid samples • Sample extract concentration • Sample extract purification (techniques) <p>Unit Five:</p> <ul style="list-style-type: none"> • Conditions for analyzing sample extract by GC • thermal analysis program • Analysis stages and columns • Sample Diagnostics • How to know the concentration of the sample • Conducting examinations and practical analysis (data analysis) on the named device and applying practically all Units above during the course in the laboratory of Environment directorate in Kirkuk <p>Unit Six:</p> <ul style="list-style-type: none"> • GC instrument troubleshooting and Maintenance
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Learning Outcomes	<p>By the end of this course the participant will :</p> <ul style="list-style-type: none"> • Learn about the different types of chromatography • Understand the definitions of gas chromatography • Learn the principles and components of the gas chromatograph • Learn the types of Chromatography Techniques in details • Learn the essential parts of gas chromatograph • Learn about the function & operation of the GC • Learn all types of the Detectors • Learn how to make different types of Sample collection and preservation • Learn about Conditions for analyzing sample extract by GC • Learn the thermal analysis program and Analysis stages • Learn the purpose and principles of data analysis • Learn about different sampling techniques for GC • Learn about a number of industries and their application of GC • Learn the importance of good chromatography • Learn about the function & operation of the individual GC components • Become familiar with the GC instrumentation • Have practical experience of adjusting the parameters for GC component • Have practical experience of performing maintenance on each GC components

• **Trainees numbers and their Geographic Locations**

Training courses name	Kirkuk	Hawija	Daquq	Dibs	Sub Total
Environment Impact assessment, Planning, and protection	20	15	0	0	35
Gas Chromatography instrument	10	0	0	0	10
Total Trainees/ Package					45