



**Government of Nepal
Ministry of Labour, Employment and Social Security
Prime Minister Employment Programme**

**Youth Employment Transformation Initiative Project
Singhadurbar, Kathmandu, Nepal**

**Title of Consulting Services: Design, Develop,
Data Migration, Deploy, Implement, Operation
and Support of National Employment
Management Information System**

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ABBREVIATION

AI	Artificial Intelligence
API	Application Programming Interface
BI	Business Intelligence
CMS	Content Management System
COTS	Commercial off-the-shelf
CTEVT	Council for Technical Education and Vocational Training
DoLMA	Department of Land Management and Archive
DoFE	Department of Foreign Employment
DRC	Data Recovery Center
EMIS	Employment Management Information System
ERD	Entity Relation Diagram
FY	Fiscal Year
FEB	Foreign Employment Board
GEA	Government Enterprise Architecture
GIDC	Government Integrated Data Center
GRM	Grievance Redress Mechanism
ICT	Information and Communications Technology
LMIS	Labour Management Information System
MSSQL	Microsoft Structure Query Language
MTOT	Master Training of Trainers
NAC	Network Access Control
NeGIF	Nepal Government Interoperability Framework
NPC	National Planning Commission
NRB	Nepal Rastra Bank
PDF	Portable Document Format
PI	Participating Institutions
PMEP	Prime Minister Employment Programme
PMU	Project Management Unit
RDBMS	Relational Database Management System

SDD	System Design Document
SI	System Integrator
SIT	System Integration Test
SLA	Service Level Agreement
SRS	System Requirement Specifications
SRSD	System Requirement Specification Diagram
TOT	Training of Trainers
UAT	User Acceptance Test
UI/UX	User Interface/ User Experience
WAF	Web Application Firewall
YETI	Youth Employment Transformation Initiative Project

1. Background

The Prime Minister Employment Programme (PMEP) is a national flagship programme launched in February 2018 with envision to guarantee minimum employment of 100 days of work to the registered unemployed or provide subsistence wage in the absence of work to the eligible household. The programme targets unemployed individuals for short-term employment and prioritizes the vulnerable.

The PMEP aims to implement the Right to Employment enshrined in the Constitution by guaranteeing minimum employment. The programme also contributes to reduce poverty and vulnerability by improving living standards of poor and vulnerable. The programme strategy consists of data collection and management of unemployed, identify and expand the areas of employment in the country, liaise, coordinate and create a convergence of employment services and promote good labour practice at the implementation level. The major component of the programme is to provide employment services through all 753 local levels, deliver capacity and skill-building initiative to meet the labour market demand and create cohesion/convergence to deliver the employment services.

The Youth Employment Transformation Initiative (YETI) is the World Bank supported project aligned with PMEP to improve employment services and labour market outcomes. The project aims to enhance PMEP performance to improve job outcomes and livelihoods, especially to youths and women. The Project Management Unit (PMU) within PMEP is established to coordinate and manage the project activities.

1.1. National Employment Context

The Constitution of Nepal has established Right to Employment as fundamental rights. Article 33 and 40 of the constitution ambitions to maximize the utilization of its resources to achieve long-term economic growth and distribute the growth equitably to its citizens. It requires utilizing national resources and tools, however the country lacks accurate data to develop a national employment eco-system that includes appropriate human resource development planning. The country is conducting Nepal Labour Force Survey in each 10 years to predict the employment and unemployment statistics.

There has been a gradual structural change in labour utilization in the country from FY 2000/01. There were 60% labour force engaged in the agriculture sector with approximately 73.95% human resources unemployed or semi unemployed or outside the labour forces as per Nepal Labour Force Survey 2018/19. It is obvious that agriculture would not be in a position to produce full-time employment to all those engaged in the agriculture sector. Based on the Labour Force Survey, 2018/19 and National Economic Census, 2018, the country has an estimated of 7,086,000 jobs, out of which only a total of 2,662,540 jobs are in the formal sector. The jobs created through the government interventions are only 9.4% (666,595), however there is no accurate projection on the

employment created through an indirect government intervention. The National Economic Census, 2018 showed a total of 923,365 industries /entities in Nepal. These industries / entities are largely trade businesses (30.65%), followed by service sector (14.13%) and production industries (11.26%). The economic survey of FY 2021/22 showed a significant structural change in the Nepal’s economic sectors. The survey showed the contribution of the service sector by 61.1%, agriculture sector by 25.5% and manufacturing sector by 13.1%. Additionally, the share of the informal worker working in these sectors is approximately 49.9%. This demands a mechanism to understand more in detail their characteristics and their input to the national economy.

Nepal to design and implement the employment promotion activities to boost the employment and self-employment opportunities in the country requires a clear set of data and indicators. The data and indicator should also reflect the structural changes that deemed necessary to analyze the context and programme implementation. This demands a clear national labour and employment information system.

With the establishment of the National Employment Management Information System (NEMIS), there is a clear need for the enterprise level concrete architecture to address the lack of an integrated system to bring information about labor force resources in the formal and informal sectors (agriculture, construction, or services) under the purview of contribution-based social security.

1.2. National Labour Market Information System

The Government of Nepal is approaching to create a labour market information system in the country in future. The government information on labour and employment was largely based on the surveys and qualitative surveys. Acknowledging the need for the National Labour Market Information System (LMIS), the National Planning Commission (NPC) has recommended a structure for an integrated labour and employment data system. The commission has recommended to design a nationally contextualized LMIS system with following broader sector and indicators as depicted in figure below:

Labour	Market	Information	System
All: Age-group, Gender, Education, Skill, Responsibilities	All: Profession, Sector, Industries / Agencies, Time and Stakeholder	Information: Survey/Study, Reliable, Accurate, Updated, Timely, Easy Access, Targeted Information and Dissemination	Defined, Guided, Institutionalized, Formal, Automated, Accepted, Transparent, Effective, Continuous and Secured

Figure 1: Potential LMIS Indicators

2. National Employment Management Information System

A clear rationale for the information and data available within an LMIS is key to ensuring that the right information is collected at right time, and is made accessible to the right users in the form that best suits their needs. As per the conceptual framework of LMIS provided by NPC, NEMIS will be currently established as a major component of LMIS to collect information incorporating various aspects of labour market indicators and shall be gradually transformed into a comprehensive LMIS.

As an entry point, the NEMIS shall have the following pillars:

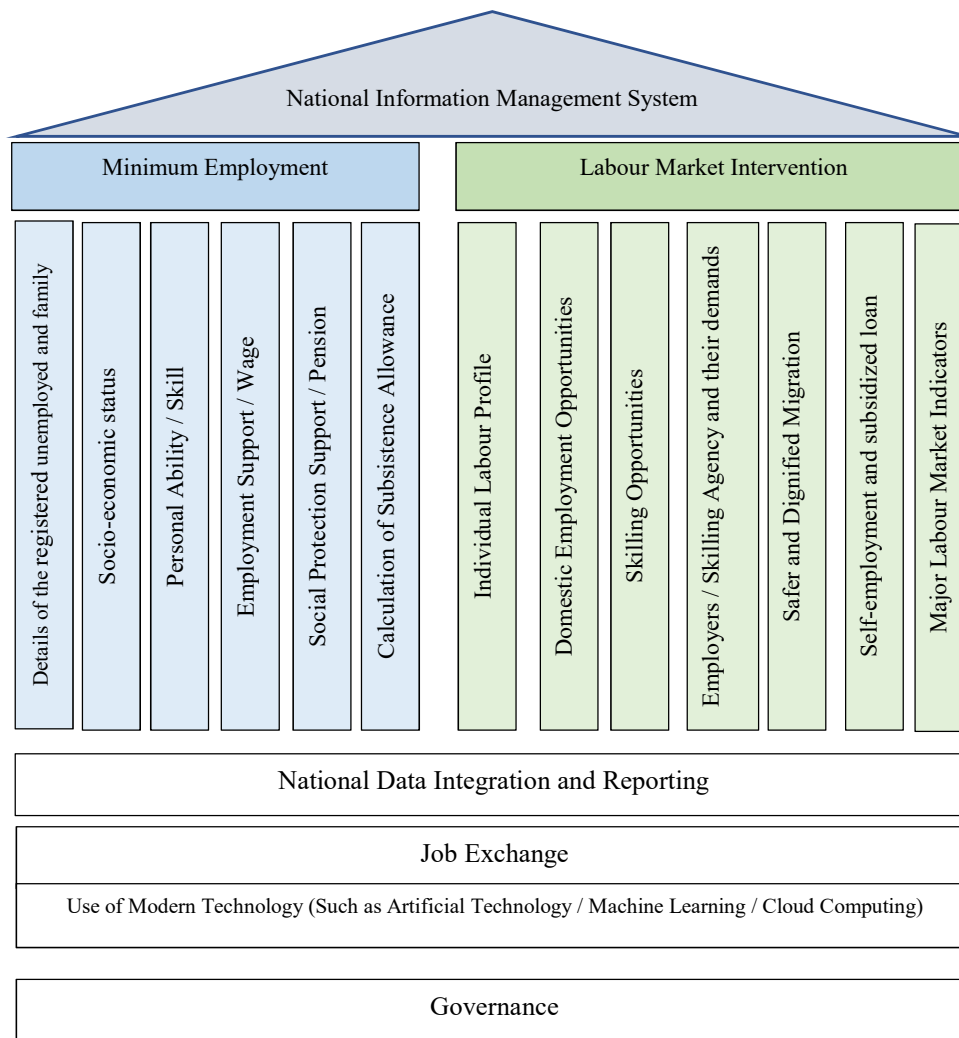


Figure 4: Framework of NEMIS

2.1. Features in the NEMIS

The holistic NEMIS shall have the following features:

- a. The existing Employment Management Information System (EMIS) features shall be re-engineered and developed as a module in NEMIS to implement the minimum employment programme. This module shall have the features of managing public works programme (PWP) organized from various ministries / offices and enrolling registered unemployed to work on those PWPs. The system should integrate with various government MIS systems and be able to produce various reports that are deemed necessary to manage employment guarantee schemes.
- b. MoLESS has plan to provide labour and employment related services through Employment Service Centers (ESCs) at local level. The NEMIS should be able to integrate various MIS systems that enable ESCs to deliver the services from the local level (described in Figure 4).
- c. PMEP/YETI is piloting unemployed support activities. The NEMIS should have the modules / mechanism to be able to manage these activities.
- d. The NEMIS should be able to integrate all government data on labour and employment in order to generate evidence based information and calculate the subsistence allowance for the concerned families.
- e. The NEMIS should have the following modules manage all labour market intervention activities and employment promotion:
 - i. Job-seeker Portal that enables all aspirant labour force to obtain employment and unemployment support activities.
 - ii. Employer Portal that enables public, private, cooperative, and non-government sectors to identify and select the labour / employee using e-recruitment process.
 - iii. Skill Development Portal with the details of various skilling initiatives from private and public entities. The portal should also have the modules to record the details of post training employment placement.
- f. Automatic integration of information such as employer details, all labour forces, labour gap, skill gap from the various MIS systems and portals.
- g. Individual login for all labour, employer, skill development agency and public works programme as well as relevant stakeholders through a single window.
- h. Use of artificial intelligence to recommend skills, job and potential employee. This includes developing the modules for private sector to motivate them to embed their systems in the NEMIS.

2.2. Expected Outcomes

After the implementation of the NEMIS, the following outputs are expected:

- a. Integration of all labour and employment data from the various government MIS systems.
- b. Individual profile integrated with Citizenship Management Information System and National Identity Card MIS for descriptive statistics on population, gender, ethnicity, age group etc.
- c. Individual profile integrated with Personal Identification Number of Inland Revenue Office to produce evidence on employment status and projection of annual income.
- d. Identify person and family who has received / receiving social protection benefit and pension using Social Registry System or other pension MIS.
- e. Derive information whether the person is engaged in contract / employment with any employer within the country or outside.
- f. Detailed profile of employers established within the country.
- g. Information whether the person is in foreign employment and identify his/her family members.
- h. Available job opportunities from diverse sources such as public, private and other entities
- i. Registered individuals shall be able to receive information on job vacancy and any other unemployment support related activities.
- j. Promotion of domestic employment and skill development.
- k. Informed decisions by individuals, companies and institutions in the labour market at a single platform.
- l. Real-time information related to labour market for evidence-based policy making
- m. Effective delivery of employment services and social protection activities
- n. Identification of emerging occupations and required new skills in labour market.
- o. Use of AI / Machine Learning to identify new labour, wages and skill demands.

2.3. Contribution of NEMIS for future LMIS

After the development and utilization of the NEMIS, the following indicators for the LMIS shall be produced:

- a. Individual details of the person who is either in domestic or foreign employment
- b. Description of employment status according to the economic activities
- c. Cross tabulation of skill and employment status
- d. Employment details based on the economic status of formal and informal sector
- e. Early projection of employment and unemployment rate
- f. Early gap assessment of employment demand and supply
- g. Early gap assessment of labour demand and supply
- h. Early gap assessment of skill demand and supply
- i. Early gap assessment of skill based wages

- j. Early gap assessment of occupational shortage and demand

2.4. Analysis of current system and its functionality

PMEP has initially developed an Employment Management Information System (EMIS) to record the registered unemployed individuals and their work / payment. The ministry has a plan to re-engineer the system to be able to manage the followings:

- a. Managing all public works programme across the nation.
- b. Access management to various stakeholders
- c. Manage minimum employment programme that includes identifying poor and vulnerable households, capturing the details of employment status and social protection benefits from the governments.
- d. Enrollment and Payment of beneficiaries. The payment may be online also.
- e. Develop various ad-hoc reports (including cross-tabulation features and Business intelligence tools) according to the needs of local, provincial and federal governments.
- f. Able to generate evidence to pay the unemployment benefits as per the Article 22 of the Right to Employment Act, 2018.
- g. Able to capture the details of the private sector, skill development academies / entities.
- h. Strengthening of unemployment and job seeker registration, profiling, placement, referral and monitoring.

The government with the aspiration of embedding the system into the NEMIS, the current feature of the EMIS is limited in managing the public works programme of the PMEP and YETI Project only. The reporting structure is yet to be strengthened. The major limitation of the current database is poor data structure together with un-scalable database along with redundant data in multiple tables and inadequate processing capacity.

2.5. Government Data Integration and Sources of Data

Government of Nepal has been operating various MIS systems among which following systems are identified for data integration with NEMIS for evidence-based information collection:

S.N.	System	Functional Need	Integration Method
1	MoLESS's EMIS System	Minimum Employment Guarantee	Direct Integration / Data Migration
2	Various Employment Portal of Private Sector	Job seeker profile (name, skill, education, work experience, gender, caste and geography)	API and Web scraping

3	Citizen Records of Ministry of Home	Name, date of birth, caste and family tree	API
4	Vital Registration of Ministry of Home	Birth, Marriage, Migration, Divorce and death	API
5	Social Registry of Ministry of Home	Social benefits (individual and family)	API
6	Pension, Social Security Fund, Employee's Provident Fund, Citizen Investment Trust	Job status, income and pension support	API
7	FEIMS of MoLESS	Foreign Job demand, skill demand and person detail of migrant workers	Direct Integration / Data Migration / API
8	PAN Database of Inland Revenue Department	Individual Name, Income and employment status, Data related to employer, location, income and contact	API
9	Land Record MIS of DoLMA	Land acquisition details of individual and family	API
10	Poor Family Identification System	Detail of certified poor household	API
11	CTEVT and other government training provider	Name of person receiving skilling, skill type and skill area	API
12	Financial Comptroller General Office	Details of budget and expenditure in employment and skill development sector	API
13	Bank and Financial Institutions(NRB)	Person receiving financial assistance. Loan details	API

These details are also required to identify a family who is constitutionally guaranteed to provide unemployment benefits along with subsistence allowance.

2.6. Services from NEMIS at Local Level

MoLESS, as part of the 5-year strategy, is to deliver integrated labour and employment services at the local level. The services delivered from Local Level is illustrated in Fig 4. At first phase, there is an immediate demand of the system integration of the MIS systems currently operational

through MoLESS and its entities to provide labour and employment related services at local level ESCs. The services that can be delivered at local level is illustrated in the figure below:

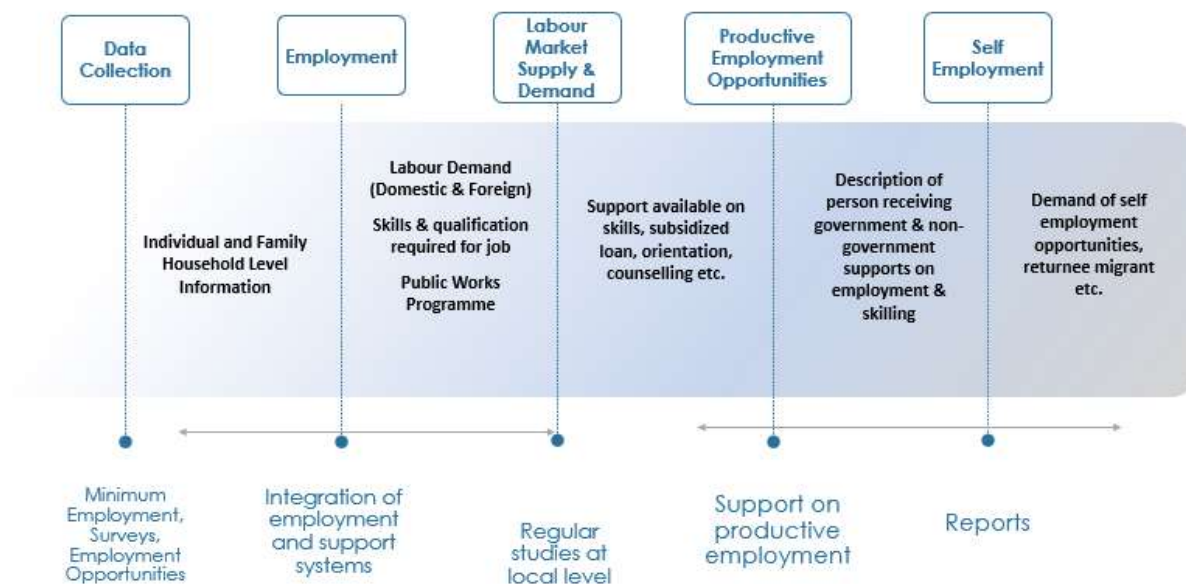


Figure 2: MIS Integration and Features for Local Level

3. Objective of this assignment

The main objective of this assignment is to hire a qualified organization/consulting firm for the design, development, data migration, deployment, implementation, operation and support services for an integrated web-based NEMIS Platform.

The project is expected to lead the commissioning of a system capable of achieving the following main objectives and activities as below:

- Provide necessary interfaces for the job seeker registration, profiling, online job application, job search, matching of jobs with vacancies, placement in jobs, and referral to other, monitoring and notification services.
- Integration of restructured EMIS module in the NEMIS, which will include sub-modules for registration, selection, enrollment, payment, Grievance Redressal Mechanism (GRM), and citizen engagement for temporary employment and capacity building programs.

- Expansion of job portal functionality to develop a comprehensive database of available job vacancies in Nepal.
- Provide necessary interfaces to guide labour market actors for informed decisions around their plans (e.g., prospective students in choosing their career plans, employers in setting their hiring policies) and support government agencies in developing evidence-based employment and training policies to reduce any identified skill mismatches between labour supply (availability of skills) and labour demand (hiring occupations).
- Provide a unified and scalable NEMIS architecture with all the functional modules mentioned in this document.
- Provide a common platform for Government, Private sectors and Non-Government Organizations for employment promotional services and increase employment opportunities.
- Provide data exchange interfaces to the participating institutions and stakeholders.
- Provide documentation and procedures within the system for its further maintenance and development.
- Conduct NEMIS Platform key-users training for MoLESS and other participating institutions (PIs) using training for tutor (MTOT) approach.
- Build the capacity of the relevant staffs for the operation of NEMIS.

4. Key Tasks / Scope of work

For the development of NEMIS, the scope of services shall include the following major components of but not limited to:

- i. **Diagnostic, review and validate** the overall business process of the project implementation and perform detailed study of the current rules, regulations and existing systems (AS-IS Analysis) to analyze and map the context of NEMIS design, development & implementation in compliance with the report provided by National Planning Commission in 2079 Kartik on LMIS framework and submit report to MoLESS/PMEP.
- ii. Conduct a comprehensive **Business Process Analysis** consulting with multiple stakeholders mentioned in this document and prepare a TO-BE report based on the gap analysis. Submit the report with meeting minutes to ministry for review.
- iii. Produce a **System Requirement Study (SRS) and System Design Document (SDD)** with the inclusion of data flow diagrams, Entity Relationship Diagram (ERD), system inter-operability design protocol with the recommendation of the development platform and provide technical comments/feedback to ensure that the NEMIS objectives are met as desired, and obtain SDD approval.
- iv. **Conduct hardware assessment** of the existing ICT infrastructure such as servers, Data Center, Data Recovery, networking etc. in the context of evaluating optimal solution for implementing NEMIS and recommend system infrastructure with license requirements.

- v. Perform **System development, deployment, configuration and commissioning** on test servers along with mobile application and present to ministry for review and approval. After final approval, the final deployment of system must be performed at hardware infrastructure provided by MoLESS (*hardware procurement is not a part of this assignment*).
- vi. Conduct **NEMIS Platform testing in various level** with the piloting phases. The issues identified during the piloting will be incorporated in the software immediately.
- vii. The consultant shall organize validation workshop and demonstrate the software in order to validate the software and obtain **NEMIS Platform Operational Acceptance** for final deployment.
- viii. Conduct **NEMIS Platform user training and capacity building** for MoLESS IT Team and other participating institutions using MTOT approach.
- ix. Each and every module must be done **security audit** from the third party and required bug fixing must be done as per suggestions in security audit report before handover.
- x. Provide **NEMIS Platform maintenance and implementation support services** for a period of next thirty-six months after Operational Acceptance. Six months of warranty from the date of end of the maintenance and implementation support services period shall be provided.

5. Functional Requirements in NEMIS

The outlined below now provides a high level functional and technical requirement for the consulting firm to get a broader sense of the features and functionalities of the proposed platform under this assignment. Using this as a basis, it is the responsibility of the consulting firm using their proposed qualified skills, expertise and domain knowledge – gather deeper understanding of the business needs, analyze it from the prospective of applying international practice and standards, more practical innovations and design techniques that meets the overall objectives of this assignment.

The application software will be centralized web-based application system, the application will be real time system, the main database and application will reside in GIDC and Backup of application and database will be in DR site at Hetauda. The system must have strong in-built security feature, both in the database and in application layer. This application must be able to provide features for G2G and G2C operations. The system should be designed in such a way that if any new business logic is introduced in the future, the system should be able to incorporate the business logic change as a pluggable and upgradable module. Extra and beyond jobs other than TOR and SRS, consultants will be resettled. The system should comply with the following architectures along with all the features existing in the system.

Application Architecture

- The system should be able to maintain activity and transaction logs.

- Document in every phase should be saved in unalterable format in the database which can be read by the system when required. This will facilitate government audit log.
- System design should be modular and dynamic to accommodate future exchanges and development.
- Architecture should be scalable when the number of users increases without doing the code level modification.
- The solution shall provide scalable access services, including scalability in terms of the number of users, user groups, resources, and access control policies.
- It should be flexible enough to support plug-in and plug out of the modules as per future requirements.
- Architecture should be highly secure as it contains very sensitive government data.
- System design should have exception handling and error reporting mechanisms,
- System design should be such that the System configuration setting is fully customizable.
- Provision of reference table should be made which should be editable from the backend with the historical feature of such edited fields.

Integration Architecture

- The system shall be based on Service Oriented Architecture (SOA) or better.
- System design should be able to interchange data with other government systems.
- All the communication should be recorded in the raw format along with date and time of communication.

Database Architecture

- Develop relational database management system (stored procedures, packages, configuration of database server, DBA administration).
- Database Management System having facilities as listed below:
 - Proper data validation (client or server-side) should be depicted in the design document, and should include which data are validated on the client-side and which data are validated on the server-side.
 - The design should consider the reuse of existing data and the use of data existing in other government entities.
 - The RDBMS shall be viable, able to handle the workload of NEMIS and should be provided by the vendor. As far as possible best freeware /open source database should be used.
 - If the ministry chooses to use another RDBMS, the system should be able to support relational database management architecture. Easy switching mechanism between the database management systems must be available.
 - Different types of logs associated with the system should be properly stored and managed.
 - Database architecture should be developed in such a way that daily statistics must be summarized and stored in the separate statistics table and reporting should be done from this table.
 - The critical data in the database shall be stored in an encrypted format.

- Cache mechanism must be utilized for reporting and other references tables so that database hits will be minimized and system performance will be increased.
- Database backup and recovery plan should be proposed.

Transaction log Management

➤ Transaction logs should be stored in the database history table which should be associated with each table developed and subsequent sequence number must be mentioned. Such a history table should be readable by the system only and modification from the database should not be allowed.

Workflow management

- Workflow management should be dynamic and must be configurable.
- Field level modification of mandatory, optional and prohibited must be configurable.
- Business logic must be customizable from the GUI interface.

NEMIS shall have following functional modules:

5.1. EMIS as Minimum Employment Programme Management Module

The current EMIS system requires massive restructuring and upgradation for complete management of the minimum employment programme. This includes strengthening and enhancing the EMIS in line with the broader NEMIS system and undertake the enhancement of minimum employment management modules that are deemed necessary to upgrade to the state of point 2.4 above.

5.2. Job Seekers Portal

The NEMIS shall develop an infrastructure for all public and private institutions to use for the purpose of employment exchange. The module shall provide jobseekers with following features:

- Able to build verified individual profile and resume with their expertise areas of seeking the job.
- Able to search and sort available job vacancies matching his/her resume.
- Able to view the applied jobs they have applied for and receive notification upon the matching job criteria together with their profile visits.
- Able to track the status of the application process.
- Able to obtain notes and support in terms of building resume, job placement, and interview techniques.
- Able to view/understand skills/occupations in demand and understand potential career choices.
- Able to get job recommendation features
- Able to explore top companies with the available jobs of the different sectors
- Able to view the log record of employment history.
- Module shall have job meter, average salary ranges for his/her skills.

5.3. Employer Portal

The NEMIS shall have the demand side module that contains employers, job demand, defining job criteria, application process, search potential jobseeker matching the criteria and manage records of offer of the employment.

This module shall consist of the following features:

- i. Able to build verified organizational profile.
- ii. Able to view and filter/sort the job applications received for a particular vacancy
- iii. Able to further process the applicants like selection of candidates for interview, setting date for the interview, final selection, etc.
- iv. Able to view job seekers' profiles (even if they have not applied for the job) as per their requirements and also should be able to process them.
- v. Able to view the details of applicants that have applied, processed, selected, etc.
- vi. Able to view the log records of employment provided.

5.4. Job Portal

The NEMIS shall contain the jobs portal that shall serve as an aggregator (an omni-channel environment) of information from both public and private e-recruitment services (such as merojob, ramrojob, public service jobs, foreign jobs, etc.). As there can be possibility of integration of more and more public and private systems thus there should be functionality to easily authenticate and integrate for better data exchanging mechanism between those platforms and monitor the same. This module shall provide online services for jobseekers and employers including registration, job and current employment support programs listing (i.e., skill training, self-employment support programs, etc.) by location, etc. It shall also offer additional functionalities such as online training and peer-to-peer support for jobseekers.

Some of the key features expected in job portal are listed below but not limited to:

- i. Algorithm built into the portal to match job seekers with vacancies. This might be useful for the less vulnerable workers who can match relatively more quickly.
- ii. For registering vacancies, might be worth thinking of ways that can help the Government develop a sustainable system to routinely collect and register vacancies, like cost-effective digital solutions that are emerging in other countries to identify labour demand and growing occupations. This can include web scraping of multiple job vacancy platforms as well as the development of digital applications that can help employers express more easily skill needs and occupational shortages. Other examples also include developing common standards for vacancies posted by different public and private providers, to favor their exchange.

- iii. API management for handling the API consuming and publishing to exchange the required data for better data for job matching, training, skills, etc.

5.5. Employment Promotion Services Portal

The NEMIS shall have the employment promotion services showing the skill in demand, various ways to obtain public and private employment promotion services and subsidized loan products. Along with data integration, this module shall provide the following features but not limited to:

- i. Able to build verified profile.
- ii. Able to register services offered and timeline
- iii. Able to target individuals seeking training and other employment services
- iv. The module shall act as a counselling platform for the individuals seeking training advice and other employment support activities
- v. Able to query for the interested training programs
- vi. Individual interested to able to apply to seek training and other promotional services
- vii. Individual shall get notification if any training events or promotional services are created or invited by the training / employment service provider
- viii. Act as counselling platform for the individual seeking training advice

5.6. Web Portal

The NEMIS shall have a web portal (or, a website) that shall bring information together from diverse sources (dependent or independent), including from other websites and databases, in a uniform way, intended for public use. The web portal also has the required level of APIs exposed in secure manner to give possibility to build mobile apps and also integrate with other survey tools for capturing of the data or expose the data to authorized tools.

Other functionalities within web portal in line with enhancement in existing PMEP EMIS and other activities planned in long-term roadmap of LMIS.

- Online application (to minimize burden on ESC & increase transparency)
- Eligibility verification and eligibility decision
- Application prioritization and job recommendations
- On the job skill training attendance
- Dynamically updated training, entrepreneurship, and another promotional services repository
- Job matching
- Intake form for job placement and profiling/referral into promotional services
- Profiling into promotional services
- Record of referral and integration with referral systems (Productive inclusion, Skills & Training, Migration)

- Strengthened M&E to reflect additional services (including placement/referral record)
- Women Jobs Clubs placement
- Connection to surveys
- Connection to other databases
- Budget and expenditure tracking for the employment sector in Nepal
- Generation of key labour statistics at local, provincial, and federal level

5.7. Integrated/Common Information Module

The NEMIS shall consist of multiple flows of information or data from different sources. This includes embedding the sources from various surveys including Nepal Labour Force Survey, National Living Standard Survey and specific or purposive studies. The data integration consists of the data from various government information systems (but not limited to point 2.6 above). This multiplicity of data sources is required to achieve national data integration together with managing minimum employment programme. This module shall be a common information system that shall provide links to these different data sources. However, the following points must be considered while developing this module:

- Since different organizations will be responsible for collecting this data, including those of private and sensitive, stakeholder engagement will be key to ensure that the flows of information are maintained in a secure manner and the organizations involved can trust that their information will be treated securely and sensitively.
- Standard occupational and industry classifications are deemed necessary in the data integration of different data information systems. The government approved standard classification shall be deployed in the NEMIS.
- Classify and cluster data entities and variables from different sources
- Review existing Labour Market indicators to be tracked on the regular basis under NEMIS umbrella and the source of data.
- Develop meta data for all identified indicators to ensure consistency and transparency.
- Analyze the different formats from different sources to agree on standard data exchange format.
- Establish mechanisms of regular data exchange from different data sources.

5.8. Grievance Redress Mechanism (GRM) Module

The NEMIS shall have a GRM module enabling users to register their grievances or complaints, or queries related to services provided by PMEP or MoLESS. The module shall track and manage the grievances redressal mechanism. The system also registers response and its media.

This module must have a role-based access control mechanism to process, retrieve and update status of user queries. Also, this system shall consume the web services exposed by NEMIS system to retrieve the required information of beneficiaries.

GRM module must have following minimal features:

- The module must have intuitive GUI for registration of grievances or complains or queries for users on the issues related, for instance, data quality, incorrect information, information update requests etc. using a unified platform,
- The module shall have the functionality to generate electronic forms for each type of grievance/complains online or through the mobile app or by phone calls,
- The module must have role-based GUI for ministry staffs at least for administrators and operators for processing, tracking and update the cases/ queries with unique case number,
- While processing the grievances, this module shall call the web service exposed by NEMIS on its integration platform to retrieve information, status related to the beneficiaries,
- The module must have a standard web service interface i.e., service façade.
- The module shall track the life cycle of each grievance (opened, pending, processed, resolved, unresolved, closed),
- The module must send email alerts or send SMS alerts along with custom messages entered by operators or administrators once the case has been processed or resolved or for unresolved cases for a pre-fixed period of waiting time, automatic escalation as per the predefined business rules. Also, allows operators to escalate the issues to administrators.
- The module must be capable of generating several types of reports. The reports must be generated based on criteria such as total number of service/cases requested within a day/week/month/year, types of requests made, status of case registered,
- The module shall manage the knowledge base and help center for the grievances processing operators and administrators that provides reference resolution of similar grievances handled before for finding quick solutions.

5.9. Business Intelligence and Analytics Module

The NEMIS shall provide capabilities for publishing business intelligence interactive dashboard and reports to better use of the collected data for decision making. It should also provide an efficient mechanism of modelling the captured data to visualize the job trend, application flow, job classification, etc. There shall be well organized dashboards and reports for all levels of system users for better use of the data; job seekers, students, training institutes, policy makers, employment support programme and private sector. To achieve the overall idea of business intelligence and analytics capabilities the overall system architecture will be designed and maintained accordingly.

This module must have following minimal features:

- **Dash boarding and Data Visualization should be:** Interactive Data Visualizations; Data Storytelling; Filtering; Drill-Down and Drill-Up Capabilities; Auto-Charting; Geospatial Visualizations and Maps; Animations; Advanced Visualizations using external tools; Auto-refresh and Real-time Updates; Pre-Built Templates and Web Accessibility, etc.
- **Data Source Connectivity:** Standard Files (i.e., Excel, CSV, XML, JSON, PDF and more), Statistical Files; Relational and NoSQL Databases; JDBC, ODBC and Parameterized Connections; Big Data Ecosystems; social media, SEO and Web Analytics Platforms; and Enterprise Messaging Platforms; SFTP/FTP Support, etc.
- **Data Management:** Data Exploration; Data Modeling; Data Preparation; Data Blending; Extract, Transform, Load (ETL); Metadata Management and Data Catalog; OLAP and Multidimensional Analysis; Data Governance; Advanced Data Preparation using others tools,
- **Data Querying:** Query Multiple Data Sources; Complex Queries; Scheduled Queries; Readable and Modifiable SQL; Multi-Pass SQL; Batch Updates; Visual Querying; In-Memory Analytics; Live Connection, etc.
- **Data Analysis:** Ad Hoc Analysis, Segmentation and Cohort Analysis, Cluster Analysis, Scenario and What-If Analysis, Statistical and Regression Analysis, Time Series Analysis and Forecasting, Predictive Analytics and Predictive Modeling Markup Language (PMML) Support, Text Mining (Text Analytics) and Sentiment Analysis, Social Media and Web Analytics, Geo location Analysis; Advanced Data Analysis using Python and R
- **Augmented Analytics:** Augmented Data Preparation, Automated Descriptive Insights, Key Driver Analysis; Automated Anomaly Alerting, Auto-Generated and Analyzed Segments or Clusters, Auto-Generated Forecasts or Predictions, Contextualized or Relevant Insights, Automated Feature Generation and Selection, Automated Algorithm Selection and Model Tuning, Automated Model Packaging and Monitoring,
- **Reporting:** Managed Reporting, Conditional Formatting, Interactive Reporting, Ad Hoc Reporting, Auto-Schedule Reports, Built-in Alerts, Reports Exporting, Reports Versioning.
- **Embedded Analytics:** White Labeling, Multitenancy Support, Version Control, Mobile App Embed-ability, In-App Reporting, Background Processing, Integrated Workflow Actions,
- **Security:** Authentication Protocols and Systems, Single Sign-On and Trusted Authentication, Object-Level Security; Row-Level Security (RLS); Column Level Security; User Filtering; Application Activity Tracking; Integrated Security; Encryption;

- **Extensibility, Availability & Scalability:** Dynamic Scaling, High Availability, Fault Tolerance, API Extensibility and IDE Support.

Examples of analytical reports and infographic summary data extracts for insights like;

- Unemployment rates, employment projection, workforce shortage, industry demands & projections
- Employment by region – job active data, employment by industry and occupation, population, salary scale, etc.
- Vacancies – by profession, region, scale, skills, most new jobs, popular jobs, etc. (with visual infographics)
- Employment projection for industry, occupations, skill-level, regions, etc. in 5 years
- Employer’s recruitment insights – recruitment activity, difficulty rate, expectation to increase staffs, highest paying occupation, etc.
- Top growing industries and projection for 5 years and possible demands by occupation, location, etc.

5.10. Mobile App

A mobile app shall be designed, developed, tested, and made readily available for the installation on the tablets for the purpose of using NEMIS system.

The mobile app will enable PMEP to organize verification and validation campaigns at local level in both online and offline scenarios. The ECs at local level will search beneficiary’s records and perform data entry, verification and validation of beneficiary.

Further, the mobile app shall implement two types of services:

- **Specific User Services:** Role-based user services
- **General User Services:** Services available for general citizens by simply downloading the app from cloud. General Citizens query their own information and register, get notifications and track their grievances.

Mobile App must have following minimal features:

- The mobile app shall be download from the cloud such as Google Play Store and App Store to be able to install and configure in citizen’s mobile phone for general user services.
- The mobile app must have intuitive GUI as integrated form to verify, update socio-economic information, track geo codes, upload documents and image files and other relevant information of beneficiaries with survey tools also ,
- The mobile app must be synchronized with central NEMIS system once the connectivity network is available. For this the mobile app shall keep track of each record for e.g., updated at local, synchronized with central, verified, validated etc.,

- The mobile app must have strong authentication mechanism to provide the access to the data stored locally,
- The mobile app must have additional feature to handle grievances such as registration and readdress functions for grievances,
- The beneficiary's data marked as "verification needed" shall be pre-loaded into tablet so that the ECs could continue data collection, verification, and validation in offline conditions also.

5.11. System Management Module

The system management module must be created in a fashion that will allow for the creation, setting, and updating of master data, the activation and deactivation of business rules, and the value of linked processes and sub processes that are specified by legislation or regulation. Without any hard-coded intervention, all application-related configuration changes must be managed via a backend system management web interface. Options, selections, and popups for different types of data should be programmable from the system administrative interface.

This module must have following sub features (other sub-features can be added later as per requirement):

- CMS Management
- User Management
- Log Management
- Report Management
- Dynamic form management
- Organization Management
- API Management
- Security and Configuration Management

5.12. Chatbot

The NEMIS shall have the Chatbot based on the artificial intelligence and provides the following features:

- 24/7 support service: Chatbot should be able to provide a full-time service to the users of NEMIS system.
- Simple User Interface Design and User Experience: The user interface should be simple and user interactions should be straightforward and intuitive.
- Personalized Conversation: Chabot should remember information like a user's name and reason for seeking support. The interaction should not feel automated, but rather natural. The goal is to have conversational AI and UX. Businesses can use AI and machine learning to comprehend what users are saying and respond in real time.

- **Ability to Learn:** The bot should not only be conversational, but it should also be able to store relevant information for future interactions using progressive profiling.
- **Acknowledge when questions are beyond their scope:** Chatbot should be designed to realize when a query exceeds their abilities. They should be able to acknowledge when they can't answer a question, end complex issues to human customer service representatives, and record the information so creators can prioritize features to work on for the next update.
- **User Experience Comes First:** Chatbot should be able to provide users with a menu of popular FAQ options, sometimes based on their previous interactions. If the Chatbot is unable to handle a complex request, it instantly sends the issue to a live customer service representative.
- **Omni-channel:** Chatbot should be able to broadcast important information across different major channels. If a user provides identifying information like their order number, email address, phone number, or any other personal data, and the Chatbot has to transfer the user to a website, that information is automatically filled into their form. This makes it convenient and reduces repetitive information inputting for the user.
- **Analytics and Reporting Tools:** The PMU should be able to review key metrics and KPIs as well as common interactions. Some of the key metrics include the number of users (active, engaged, and new), satisfaction perception, self-service rate and more. Chatbot should be able to suggest and recommend jobs or services for a user based on current or previous interactions.
- **Language:** The Chatbot must be deployed with multilingual (Nepali and English) conversation capability.

Note: Other necessary modules that are identified during the requirement analysis phase of this project can be introduced.

6. Non-functional Requirements

6.1. User Interface and error message handling

The system shall be a browser-based application that should work over the Intranet and/or through a secure Internet. The user interface should be user-friendly and easy to use by the users and should provide proper & clear messages (alert or error or notification) for better understanding to action ahead. Each alert that is generated by the system, tickets are generated to system admins such that they can trace back and resolve them.

6.2. Query and advance search

The system shall provide simple and advanced query and search facilities to all users or the system and possibility of exporting data into Excel/PDF for allowed users. This module allows users to build ad-hoc reports/listing from any part of the NEMIS database but limited to the datasets that are permitted to view for the user.

6.3. Language Selection

The system should be capable of handle multi-language and able to consume Unicode or Nepali fonts along with English language.

6.4. System Audit Trail

NEMIS Platform shall maintain the log of all changes or transactions to support required detail tracing of the transaction or operations in the system. Along with key data, it will store the authentication token, the user login details, time stamps, etc. All audit logs must be immutable and a validation mechanism must be put in place to ascertain the authenticity of the audit log. This is to validate that the audit log hasn't been tampered with from the backend via database queries. Transaction logs should be stored in the database history table which should be associated with each table developed and subsequent sequence number must be mentioned. The system audit trail will be in a separate database to reduce the load in primary data for transactional data.

6.5. Data Security, Access, and Authentication

The system should provide standard data security standards and access control for better application protection. The access control system allows NEMIS admin to create very fine-grained roles and permissions within the roles. The system keeps track of roles assigned to the users or groups and provides access based on it. Though the NEMIS system will have multiple components, access and rights management will be implemented via a centralized and single system.

6.6. System Installation, Configuration and Data Hosting and Backup

This activity involves installation and configuration of the system in the hardware/servers allocated for NEMIS hosting in a secure and reliable manner. The consulting firm is responsible for installation and configuration of the system in the hardware infrastructure and works closely with the hardware supplier, Government Integrated Data Center (GIDC) and Data Recovery Center (DRC) in achieving the objective.

Backup recovery plan should be designed in such a way that the maximum data loss period should not exceed more than five minutes.

6.7. System architecture compliance

Overall system should be compliant with GEA Standard and NeGIF and all the mandatory artifacts defined by DoIT under GEA should be submitted to PMU. The system development process shall also follow and comply with Government of Nepal's Information Technology System (Management and Operations) Directives, 2071. Also, the banking industry have proven implementation of secure infrastructure and architecture by enforcing the NRB Guidelines. The same can be enforced for NEMIS.

6.8. Sizing, performance and scalability

The system shall be capable of handling large volume online transactions from users and API integration with multiple external systems. As and when required, new nodes can be added to meet the high traffic requirements. The system processing shall be scalable to support the volume estimated for a period of 10 years at 8-10% annual growth rate.

6.9. Data Migration

Possible data transformation and loading of captured survey data into the NEMIS system and migration of program specific data like EMIS’s into NEMIS for further use of data. Estimated data size of EMIS migration could be up-to 60GB or more depending on the time of the migration.

6.10. Version Control

The Consulting firm must maintain the version management system at the private platform provided by ministry to maintain the updates of the code from the very beginning of the project. The source code of all the developed modules should be updated in the private git server from initial phase. All the deployment in the live, test and other server should be done through same source code and if compilation is required, it should be done at destination.

6.11. Availability

NEMIS system must be fully available for its intended use even during scheduled maintenance, the proper message must be provided by the system to the end-user about the maintenance duration. The system must have 24/7/365 uptime with an SLA of 99.9%, other than planned maintenance downtime.

6.12. Performance

The performance of a system constitutes of the response time of the system to any request from the client, the load on the system for executing any request, the number of concurrent requests that a system can handle, etc. System MUST meet the following minimum performance standards/response time during the implementation of the system.

User Authentication and Authorization	<1 second
Simple search- Single, table, 5 fields, 3 conditions with screen rendering	<3 seconds for 100,000 rows
Complex search- multiple joined table (5), 10 fields,3 condition- without screening rendering	<5 seconds for 100,000 rows
Loading page	<3 second
Saving a record	<5 second
Report preview- (all reports)- initial page view (if asynchronous)	<60 seconds in most instance. It is understood that complicated/large volume reports may require a longer period

6.13. Third Party Audit

The consulting firm shall conduct Security Audit and VAPT of the following components under this assignment. The firm is highly encouraged to propose the task and activities to be performed under this assignment. The firm shall recommend at least three IT Audit Firms in consultation and approval from PMEP, due diligence is used in hiring audit firm from PMEP and consulting firm to assign the audit firm in terms of quality and cost considerations.

Scope of Audit

- a. NEMIS Web Application
- b. NEMIS Android Application
- c. NEMIS iOS Application
- d. NEMIS Network Infrastructure

6.14. Third Party Licenses

The consulting firm is highly encouraged to propose open-source tools and technology and customize them according to the requirements. If any third-party software is proposed, the consultant must provide the valid perpetual license of such proprietary solutions at least for a period of five years.

7. Training / Knowledge Transfer

Training is an integral part of this project. The consultant shall prepare all necessary training materials, user manuals and organize the trainings to the relevant staffs of MoLESS/PMEP according to the requirements.

It is the responsibility of consulting firm to arrange basic training logistics such as training materials, Nepali speaking training experts, handouts, online video tutorials and user manuals. Ministry will provide list of training participants and contact details. At the outset of the project, the consulting firm is expected to draft a Training Plan for acceptance by the MoLESS outlining the training activities, audiences, number of participants, curriculum, etc. to be completed during the project period. It is anticipated that the Master Training of Trainers (MToT) approach may be adopted. The consultant should provide the schedule for knowledge transfer.

The consulting firm shall organize following trainings:

7.1. Operational Training:

The consulting firm must organize the training for day-to-day operations implemented in NEMIS web portals and also to the supervisors in *Master Training of Trainers (MToT)* approach for at least 24 participants up to three days. The target audience of such training programs are the actual users such as the staffs of MoLESS/PMEP. The training shall cover at least following topics:

- Operational tasks and tools,
- Detailed processes of NEMIS,
- Workflows implemented in NEMIS Portals,
- Correction and verification of individual details,
- Use of NEMIS web portals, etc.,
- Production of several reports and statistics from NEMIS web portals etc.

7.2. Knowledge Transfer / Capacity Enhancement of IT Personnel

The consulting firm shall organize following knowledge transfer training programs for at least *six* IT personnel of PMEP for up to 20 days in total. These programs shall be designed to provide knowledge on the overall system architecture, server configuration, license upgrade, network configuration, upgrading the system when required from both hardware and software perspective. However, the consulting firm may also propose for any other training programs/courses (other than mentioned below) which seems necessary for the capacity enhancement of PMEP's IT team.

7.2.1. System Administration Training:

The consulting firm must organize the training for System Administration, Database Administration and Network Administration covering at least following topics:

- System administration tasks and tools,
- Monitoring the system to find the deployment issues and applying the patches or upgrade the system,
- Manage day-to-day operations including database and security related operations,
- Diagnostic methods and common events processing,
- Manage and configure to fix load balancing and failover issues,
- Manage and fix general configuration change management in deployment etc.
- Familiarization with development platform, coding structure, configuration files and others as required.

7.2.2. Application System Management Training

The consulting firm must organize the training for NEMIS systems and/or sub-system administration training for application administrators. The training shall cover at least following topics:

- Application administration tasks and tools,
- NEMIS Workflow and interfaces,
- User management (e.g. Windows active directory),
- Application monitoring and analyzing logs,

- BI tool and Reporting system (log browser, business reports generation, extracting data from the NEMIS, activity dashboards generation)

7.2.3. Service Integration Training

The consulting firm must organize the specific training for demonstration of web services implemented in NEMIS and their technical details for integration and also provide training for development of new web services. The training shall cover at least following topics:

- Presentation of integration platform,
- API, Web service development, test, deployment and management,
- Administration and operation of integration platform and its security,
- Details of web service end points and their configurations,
- Technical details of integration platform and its security,
- IDE and details of listeners, endpoints, connectors, transformers
- Source Code base and its customization for development of new web-services etc.

8. Key Deliverables and Timeline

This chapter gives an overview of minimal expected deliveries of the successful consulting firm under this contract. The successful consultant must prepare all necessary documentation for the project, and provide them to MoLESS/PMEP for review, approval, record, reference etc. as mentioned in this document. Major documents or deliverables (but not limited to) to be provided include:

S.N.	Documents to be Delivered	Time Line
1.	<p>Project Inception Report:</p> <ul style="list-style-type: none"> - Provides, at a minimum, firm’s overall plan for completing the project, - Engineering proposal and implementation report of NEMIS system processes in close collaboration with MoLESS/PMEP, - Provides a timeline for project execution including deadlines, resources, and dependencies, - Provide a plan for communications/issue resolution with the MoLESS/PMEP and agreed technical requirements. 	Within 2 nd months from date of contract

2.	<p>Business Need Analysis and System Requirement Specification Document (SRS):</p> <ul style="list-style-type: none"> - The consultant must study the existing business process of the intended NEMIS system, discuss with the MoLESS/PMEP, Participating Institutions (PIs) and key stakeholders and design appropriate business process to be implemented when operationalizing the NEMIS System, - Provide detail specification document containing detailed requirement capture and requirement analysis, necessary customizations, Data Dictionary, relevant interface specifications, application security requirements. 	Within 3 rd months from date of contract
3.	<p>Gap analysis and EMIS enhancement study:</p> <ul style="list-style-type: none"> - Perform gap analysis and provide detailed report on the study of the current EMIS system and its development plan into new NEMIS system with data migration within given time. 	Within 3 rd month from the date of contract
4.	<p>System Design Document (SDD):</p> <ul style="list-style-type: none"> - Provide a detailed description of the system architecture of the proposed systems including table structure, data dictionary, Entity Relationship Diagram (ERD), object model, integration mechanism & standards, etc. 	Within 4 th month from the date of contract
5.	<p>Prototype Demonstration:</p> <ul style="list-style-type: none"> - Provide a Graphical User Interface (GUI) based user templates with basic validation included to determine the functionality compliance and navigation flow of the system. 	Within the 4 th Month from the date of contract

6.	<p>Hardware, IT Equipment, License and Logistics detail document:</p> <ul style="list-style-type: none"> - The consultant must provide generic specifications and cost estimate for all hardware components required to meet all the functional and non-functional requirements of the project. - The consulting firm must also clearly identify and recommend PMU which servers' specification are used to run which software components. - Need assessment report containing technical specifications, propose hardware architecture, bills of quantity of hardware to be procured (if needed) for NEMIS Platform implementation. - Identify potential issues and risks in the project and provide strategies and anticipate the actions to mitigate those risks. 	Within the 5 th Month from the date of contract
7.	<p>EMIS Data Migration plan</p> <ul style="list-style-type: none"> - Provide a report on the migration of data of the EMIS to the current NEMIS with the data diagram, table structure and data types 	Within the 5 th Month from the date of contract
8.	<p>System Development Progress:</p> <ul style="list-style-type: none"> - Develop required modules and demonstrate the results to PMU in agile methodology. - Development of Mobile App. - Implement feedback provided from PMU if any. 	Monthly after Prototype Demonstration phase
9.	<p>Unit testing, Integration testing, Functional and Non-Functional test reports:</p> <ul style="list-style-type: none"> - Provide a narrative of the approach that will be used to obtain user acceptance of the developed systems as well as test scripts that will be used to verify application operation - Test plans, test cases and test results (System/Integration Test Plan, User Acceptance Test Plan) - Perform testing on the developed system 	Within the 15 th month from the date of contract

10.	<p>Operational Acceptance Test Plan:</p> <ul style="list-style-type: none"> - Provides a narrative of the approach that will be used to obtain user acceptance of the developed systems as well as test scripts that will be used to verify application operation. - Organize validation workshop and obtain Operational Acceptance 	Within the 17 th month from the date of contract
11.	<p>Handover NEMIS Platform with bespoke System's Source Code:</p> <ul style="list-style-type: none"> - Security Audit Report from Third-Party and bug fixing identified in the report - Provides complete source code and file of the system software and any other related bespoke application software. - Submit Job Completion Report and obtain Handover approval 	Handover Period
12.	<p>Training Materials:</p> <ul style="list-style-type: none"> - All training manuals, operational manual, and administration manuals, - Any other materials (including PowerPoint slides, video tutorials and manuals) used prior to conduct training to staffs at various levels. 	Handover Period
13.	<p>Knowledge Transfer:</p> <ul style="list-style-type: none"> - Operational Training - Capacity Enhancement of IT team 	Handover Period

14.	<p>Technical Documentation:</p> <ul style="list-style-type: none"> - Detailed manuals for each appropriate unit of the supplied systems, e-services and interfaces for integrations, - Systems Administration Manuals, User manuals, Installation Manuals, Operational Manuals, Maintenance Manuals, - Manuals for APIs, web services, - The documentation should consist of all the configuration details, diagrams, test plans, administration manuals, setup guides etc. as minimum. - Technical documents or mandatory Artifacts are to be submitted to MoLESS/PMEP in the format mentioned in GEA for approval. 	Within the 18 th month from the date of contract
15.	<p>Monthly Status Reporting:</p> <ul style="list-style-type: none"> - Copies (and electronic format) of periodic project status and all review reports, status reports must be provided by the firm during the execution. - Each status report should include at a minimum the current period's activity, current issues, and planned activity for the next period. 	Monthly
16.	<p>Go-Live Event</p> <ul style="list-style-type: none"> - Implementation and Commissioning of the system - Participants may be up to 100 persons 	One Event

Table 1: Deliverables and Reporting Timeline

All documents (end user, technical, training, etc.) must be provided in following formats/mediums:

- 2 sets of paper-based copies in English Language,
- 1 set of paper-based copy of User Manual in English as well as Nepali Language,
- Electronic copies in '.pdf' format,
- Electronic copies in editable document (in '.docx')
- All the above mentioned documents and reports should be prepared as per the GEA standard format defined by DoIT.

Note: As the project is envisioned in multiple phases thus system design, development, testing, implementation and go live could be in iterations; thus, some of the delivery activities will also be in iteration.

9. Project Management and Progress Reporting

The MoLESS/PMEP will team up Project Management Unit (PMU) comprised of technical and operational staff members. The consulting firm's Team Leader / Project Manager will be the primary contact for the assignment and will be responsible for ensuring timely completion of deliverables, oversee project implementation, manage the key and non-key experts, manage and coordinate the implementation of system changes, conduct monthly meetings with PMU and address any other concerns or issues the Project may have.

The consulting firm must deploy open-source project management tools at private platform provided by PMU and use it to show the milestone progress and upcoming milestone to the PMU in monthly update meeting. The firm should submit monthly progress report and documentation to PMU of PMEPE for approval.

10. MoLESS/PMEPE Input and Responsibilities

The following equipment/systems will be delivered by the MoLESS/PMEPE:

- Policy Documents, Directives and Procedures,
- Access to current EMIS system and database,
- Hardware equipment- as proposed specification and architecture after ministry's approval.
- WAN between GIDC, PMEPE and DR Site – All access controls of hardware and security appliances shall be in control of MoLESS team.

The consulting firm shall work under the close and constant supervision of MoLESS/PMEPE. MoLESS/PMEPE may assign official expert/professional to supervise and/or support the work on behalf of the ministry.

11. Workstation

The key experts such as Labour Market Specialist, Legal Advisor, Team Leader, Project Manager, System Analyst, Senior Infrastructure Expert and Data Security Expert must coordinate with ministry's officials in office time when required. Other position holders can work remotely but must work from the ministry according to the requirement and recommendation of PMU. Workspace and internet logistics will be provided at the ministry's workspace; other logistics must be arranged by the consulting firm. It is the sole responsibility of the consulting firm for the management of necessary logistics and travel arrangements, however MoLESS/PMEPE will facilitate the necessary coordination for the access of the stakeholders and data collection.

12. Stakeholder Consultation

The consulting firm must conduct frequent meetings or follow up meeting in collaboration with the Project Management Unit (PMU) for business need analysis, reengineering, designing and

development of the project with different organizations as listed below; but not limited to; for collection and discussion on aforementioned data sources:

- National Planning Commission
- Ministry of Finance
- Ministry of Federal Affairs and General Administration
- Ministry of Communication and Information Technology
- Ministry of Education, Science and Technology
- Ministry of Land Management, Cooperatives and Poverty Alleviation
- Ministry of Industry, Commerce and Supplies
- Department of National ID and Civil Registration
- Department of Foreign Employment
- Department of Information Technology
- Internal Revenue Department
- Financial Comptroller General Office
- Federation of Nepalese Chambers of Commerce & Industry (FNCCI)
- At least two universities (TU / KU or their Department of IT / Computer)
- At least five national level Skill Development and Training Centers (such as CTEVT, Vocational and Skill Development Training Center, Industry Promotion Center)
- At least five Public or Private Organizations related to labour market or Human Resource

(The consulting firm must provide report of the meetings with above mentioned stakeholders to the PMU of MoLESS/PMEP.)

13. Software Ownership

The consulting firm should bind on following constraints for software distribution, licensing, copyright, and subsequence modification:

- MoLESS/PMEP will have full ownership of the software including all subsequent modifications done within the service period.
- MoLESS/PMEP will have the full and sole authority to distribute, license, copyright, modify and re-engineer the developed system without binding obligation to any other institution.

- MoLESS/PMEP will be the absolute owner of the software and will have copyright ownership and the agency shall not replicate or reproduce or use any software developed or datasets used for this assignment without the consent of the owner.

14.Duration of the Assignment

After the contract date, the given project must be finished in 54 (Fifty-Four) months in which the entire development process will take 18 months. Following development, the consulting firm should put the system into place and offer operational maintenance and support for an additional 36 (Thirty-six) months as the support and maintenance phase after approval of Operational Acceptance. All issues, along with modifications in requirements, will be handled by consulting firm over the support and maintenance term. There will be a warranty duration of 6 months following the completion of the support and maintenance phase. It will be the consultant's obligation to fix any software bugs during the warranty period.

The consulting firm is required to develop the work scheduled reflecting the tasks of each of the study team, experts/members to meet the target within assigned time. It is required to strictly follow the timeline and go ahead into next milestone only after obtaining the approval from Project Management Unit of MoLESS.

15.Support Service for NEMIS Operations

Support Mechanism

Provide one dedicated person for call support and one dedicated software developer for on-site support to PMEP for NEMIS operations during maintenance and support period. Response to queries related to existing features via phone, email, chat, or meetings.

- **On-call and on-site support and service**
Daytime Support during office time and working days.
 - **Remote support service**
Remote support service should include support through remote platform as well as phone support.
- i. Systems/modules covered under the support service related to NEMIS operation:**
- EMIS Module
 - Jobseekers Portal
 - Employers Portal
 - Job Portal
 - Web Portal
 - Integrated/Common Information Module

- Business Intelligence and Analytics Module
- Employment Promotion Services Portal
- Mobile App
- System Management Module

ii. Tasks for support service:

As part of the service

- a. Help PMEP for management, operation and maintenance of NEMIS.
- b. Coordinate with the PMEP and conduct period for feedback and suggestion.
- c. Provide consulting services to PMEP for system upgrade.
- d. Maintain log-sheet for any service, update, maintenance and technical support provided to PMEP.

iii. Support Process

The support process must follow standards method as below:

- a. PMEP will report the issue to the on-site support or remote support team via phone call or email.
- b. The support team responds to the request within 24 hours as per the availability and urgency and creates a support ticket.
- c. The support team analyses the nature of the reported concern and fix the issue or gives the ETR (Estimated Time of Resolution) to fix it.
- d. The support team communicates the resolution of the issues to PMEP for a confirmation to close the issue ticket.
- e. If the issue still persists, the ticket is re-opened and the process repeats from step c).
- f. If issue resolution confirmation is not received from PMEP after 3 follow up emails, the ticket is closed with a closure email sent from the support team.

16. Qualification and Experience Requirements

The consulting firm must have demonstrated competence, capacity, and experience in delivery of similar products and services, and in working in close collaboration with government counterparts as well as development partners. The consulting firm having specific experience in design, development and successful deployment of information systems related to Labour Market / Employment / Social Protection will be an added point.

The following lists the minimum criteria for a bidding qualifications and experiences:

- The consulting firm must have at least ten years' experience of software design, development and implementation.

- Must have successfully completed (or demonstrate an ongoing contract of) at least four proven experiences for the design and development of enterprise level web based MIS systems for government agencies.
- Average annual turnover of NPR 50 million or equivalent in best three (3) years over the period of last seven years.
- At least 25 full time regular IT professionals working for the consulting firm at least for the past one year.

All supporting documents to verify experience and minimum qualification requirements should be submitted in EOI.

It is the responsibility of the consulting firm to maintain, manage and allocate its team resources as deemed necessary to achieve the overall objective of the project. This project is a delivery-based assignment in which payments are linked to the milestone. The following underlines, the minimum expected skill sets of technical resources that the consulting firm is expected to deploy during the project period. However, the consulting firm is encouraged to propose its own team resources and skill sets to execute the project as deemed necessary.

The project considers the following resources as the key experts and non-key experts for the duration of development period as well as maintenance and support period i.e. total duration of 54 months. The CVs of the following positions must be provided as a part of the technical proposal evaluation. It is to be noted that the consulting firm is not allowed to alter the key positions without prior consent of MoLESS. In case any alteration must be done due to unavoidable circumstances, the consulting firm must propose equivalent or better candidate for MoLESS's review and approval.

Considering the project size, nature and its complexities, the following underlines the minimum expected number of technical resource utilization for the consulting firm to get a sense of the resource requirements during the project life span. However, it is the responsibility of the consulting firm to determine its own resource requirements to achieve the project objectives as the assignment is deliverable based.

S.N.	Positions (Key Experts)	Qty. (in No.)	Input in Months	Total Man Months
1.	Labour Market Specialist (with International Experience)	1	4	4
2.	Labour Market Information System Specialist (with International Experience)	1	6	6
3.	Team Leader	1	18	18

4.	Senior System Analyst	1	3	3
5.	Senior Infrastructure Expert	1	3	3
6.	Database Administrator (DBA)	1	4	4
7.	Data Security Expert	1	4	4

S.N.	Positions (Non-Key Expert)	Qty. (in No.)	Input in Months	Total Man Months
1.	Legal Advisor	1	4	4
2.	ICT Expert	1	18	18
3.	Senior UI/UX Expert	2	3	6
4.	Senior Software Developer	2	6	12
5.	Software Developer	4	18	72
6.	Senior Android/IOS Developer	2	5	10
7.	Senior PHP Developer	1	12	12
8.	BI/Data Analyst	1	5	5
9.	Quality Assurance Expert	2	5	10
10.	System / Network Administrator	1	3	3
11.	Ethical Hacker	1	2	2
12.	Training Expert	1	2	2
13.	Documentation Expert	1	5	5
14.	Call Support	1	18	18

Table 2: Minimum resource requirements for the design, development, implementation, and maintenance and support service of NEMIS Platform.

17.Key Positions' Qualification Requirements

The firm must submit CVs of the following experts with the required documents of qualifications as mentioned below:

S.N.	Experts Qualification Criteria	Major tasks to be undertaken by the individual expert (not limiting the following)
1.	<p><u>Labour Market Specialist</u></p> <ul style="list-style-type: none"> • At least Master’s degree in Labour Studies or policy related subjects; • At least 10 (ten) years of domain experience in national and international labour policies or labour market related systems; • Research and published journals on the international and national labour market data, international training certificates on the labour related background will be an added advantage. 	<ul style="list-style-type: none"> • Review and assess government policies, rules and regulations related to the labour and employment of Nepal • Perform study and analysis to identify issues in existing policy framework that will help to develop efficient NEMIS system, • Shall assess the existing eligibility criteria for several employment schemes and verification processes for the identification of ultra-poor unemployed, • Provide comprehensive reference set of labour market indicators and definitions in Nepal for reporting and presenting of the market information and metadata, covering both economic and socio-demographic statistics. • Conducting the business process review of the program processes and functions and define with a clear ‘to-be’ processes that aligns with the local context adapting the international best practice and techniques. • Other activities as per needed to build the system
2.	<p><u>Labour Market Information System Specialist</u></p> <ul style="list-style-type: none"> • At least Master’s degree in Computer Engineering or ICT or equivalent from a recognized university; At least 15 (fifteen) years of experience in solution development and project management including at least 5 years of international experience • At least 10 project experiences (national and international) in the design, development and implementation of MIS product/solutions including specific areas such as Employment MIS/ Social Protection MIS/ Labour Market IS/ Large scale job portals and payment systems or similar systems involving integration between government agencies as Team Lead or Project Manager. 	<ul style="list-style-type: none"> • Prepare detailed project implementation plan, key deliverables, define the project goals, objectives and strategy for operationalization of NEMIS System, • Responsible to design the uninterrupted labour market information flow at national context level • Develop a project implementation plan for gradual upgrade of NEMIS to LMIS. • Responsible to ensure the quality of service associated with the project and implementation plan adapting the international best practice and techniques. • Responsible for overall delivery of the NEMIS system as per the requirement and shall be guarantor of the implemented system,

	<ul style="list-style-type: none"> • Internationally recognized professional certificates on the project management and system development will be an added point • Strong knowledge and demonstrated experience in designing LMIS shall be an added benefit. • Demonstrated work experience in labour market information system in the region is an advantage. 	<ul style="list-style-type: none"> • Monitor the project activities to track the performance of the project towards the visions and goals of the project, • Responsible for developing the test strategy and test scenarios associated with the project and execute the test cases, test results, track the bugs identified and their fixes and next deliveries, • Review the project progress against the agreed project plan, highlight deliverables, • Other activities as per needed to build the system
<p>3. <u>Team Leader</u></p>	<ul style="list-style-type: none"> • Master’s degree in any stream having sound knowledge in ICT • Having Bachelor degree in computer Engineering/ Computer science or ICT or equivalent from a recognized university will be preferable • Must have more than 10 years of experience in software development and its lifecycles • At least have experience in more than 5 project as project manager • Prior experience and certification in Project management tool will be more preferable • Good communication skills with fluency in English – written and verbal Ability to guide and coach team members • Solid organizational skills including attention to detail and multitasking skills 	<ul style="list-style-type: none"> • Coordinate with all the team members and act as a focal person for the project management for overall project period • Measure project performance using appropriate tools and techniques • Create and maintain comprehensive project documentation / reports • Responsible for reviewing and delivering the project documentation, training materials and trainings, system administration guides, user manuals etc. • Responsible for reviewing, maintaining, and tracking versions of software and project documents to be delivered to PMU, • Primary contact for the assignment and will be responsible for ensuring timely completion of deliverables, oversee project implementation, manage the key and non-key experts, manage and coordinate the implementation of system changes, • Notify the project of any problems or delays and updates statistics on key performance indicators as agreed in project implementation plan, • Perform risk management to minimize project risks • Develop comprehensive project plans to be shared with PMU • Other activities as per needed to build the system
<p>4. <u>Legal Advisor</u></p>		<ul style="list-style-type: none"> • Organize, demonstrate and maintain documents in paper and electronically.

	<ul style="list-style-type: none"> • Bachelor’s degree of Law or equivalent from a recognized university; • Licensee from the Nepal Bar Association; • 10 (ten) years of demonstrated working experience in the law related documentation of government related project. • Demonstrated work experience in the related sector is an advantage. • International Experience in the similar nature of project will be an advantage. • Preferred strong knowledge of understanding of government legal rule, regulations and procedures related to IT. 	<ul style="list-style-type: none"> • Conduct research on relevant laws of the labour market, regulations, and legal articles required for the inception of NEMIS, • Ensuring compliance of NEMIS system to the existing laws, Act and regulations on data exchange between different levels of agencies. • Preparation of proposal for the amendments or formulation of procedures, regulations and acts for implementing NEMIS system, • Other activities as per needed to build the system
<p>5. <u>ICT Expert</u></p>	<ul style="list-style-type: none"> • Master’s degree in Computer Engineering or ICT or equivalent from a recognized university • Having Bachelor degree in computer Engineering/ Computer science or ICT or equivalent from a recognized university will be preferable • Must have more than 3 years of working experience in government and public sector or international donor agencies. • Must have more than 5 years’ of experience in software development, project management and worked in all phase of the project development cycle 	<ul style="list-style-type: none"> • Shall act as an intermediary between PMEP and consulting firm after the development period (<i>18 months</i>). • Responsible for ensuring that the System runs smoothly, identifying and resolving any issues that arise, and ensuring that the system is up-to-date and secure. • Responsible for managing the System data, including collecting, processing, storing, and analyzing it. • Must provide user support and training to the system users, ensuring that they are able to use the system effectively. • Collaborate with other stakeholders, such as data providers, data users, and other IT professionals, to ensure that the system meets the needs of all stakeholders.
<p>6. <u>Senior System Analyst</u></p>	<ul style="list-style-type: none"> • At least Bachelor's degree in Computer Engineering or Computer Science or ICT or equivalent. • Master’s degree in computer science with Bachelor in IT or equivalent will be preferable. • At least 10 (ten) years of demonstrated experience working in projects of similar size and nature; • At least five project experiences in development of information systems of similar size involving integration between government agencies as System Analyst; 	<ul style="list-style-type: none"> • Conduct system requirement study/gap analysis, developing data/process flow diagrams to effectively map the business requirements into MIS, • Define detail interface documentations including interface environment context, use cases, sequence diagrams, datatypes, message representations, response codes, error codes for each of the services required for NEMIS System, • Transform and/or map the integrated labour market business processes and use cases into the business process diagrams and workflows including business process rules and special cases covering the registration/intake,

	<ul style="list-style-type: none"> • Internationally recognized professional certificates on the system design and development will be an added point; • Proven experience of developing MIS, preferably in the relevant areas such as labour management information system, job sites and job matching solutions or similar public-oriented programs. 	<p>eligibility testing and verification processes etc.</p> <ul style="list-style-type: none"> • Assess for the designing of integrated NEMIS Platform (Enterprise Service Bus) according to the project requirement and provide the best design alternatives, • Preparation of NEMIS System Data Dictionary and data flow matrix of the each of the systems and /or sub-system including their representation and storage. • Preparation of System Requirement Specification Document, • Other activities as per needed to build the system
7.	<p><u>Senior Infrastructure Expert</u></p> <ul style="list-style-type: none"> • At least Bachelor's degree in Computer Engineering or Computer Science or ICT or equivalent; • Master's degree in computer science with Bachelor in IT or equivalent will be more preferable; • 10 years of demonstrated experience in conducting hardware needs assessment, analyzing the existing and future needs and developing an optimum hardware architecture for the implementation of large-scale IT systems and solutions; • Certified hardware and/or network engineer is an advantage; • Knowledge of implementation and secure configuration of virtual environment, network equipment, load balancer, etc. • Excellent knowledge and experience in system deployment in production, failover and disaster recovery system and recommend & configure the required technology for high-availability and load balancing requirements; 	<ul style="list-style-type: none"> • Prepare the NEMIS System architecture based on the project requirement, • Prepare the technical specification and bill of material (BoM) of hardware, COTS and/or customized software required for proposed system based on the sizing, performance, capacity and throughput specified in the project requirements and different project terms, • Assess the current hardware and network infrastructure available at ministry and optimize the proposed technical specification and bill of material (BoM) and recommend the available options to ministry. • Responsible for overall IT infrastructure setup, Installation, configuration of hardware and networking IT equipment such as servers, routers, switches provided by ministry. And also prepare the documentations for these activities, • Ensure the delivered and/ or installed COTS and custom software are of latest version with recent releases fixes and are free of any identified software vulnerabilities. • Other activities as per needed to build the system
8.	<p><u>Information Security Expert</u></p> <ul style="list-style-type: none"> • At least Bachelor's degree in Computer Engineering or Computer Science or ICT or equivalent; 	<ul style="list-style-type: none"> • Shall be responsible for assessing the current trends in IT system security and data security standards, • Shall be responsible to ensure security and quality of the selected technologies, security standards, personal information protection standards,

	<ul style="list-style-type: none"> • Master degree in the Computer Science / Information Security or equivalent is more preferable. • At least 8(Eight) years of demonstrated knowledge and experience in Information security and conducting Information Systems audits and audits of backend code vulnerability; hacking countermeasures. • Internationally recognized certificates on the Red Hat Security/VMware/Cloud security will be an added point. 	<ul style="list-style-type: none"> • Shall be aware of commonly known software vulnerabilities, their fixes and releases, • Shall prepare the documentation of security administration and housekeeping tasks and their execution for monitoring. • Shall plan and implement the secure migration of EMIS's data to the NEMIS platform, • Other activities as per needed to build the system
<p>9. <u>Senior UI/UX Expert</u></p>	<ul style="list-style-type: none"> • At least Bachelor's degree in IT related fields; • At least 10(ten) years of demonstrated knowledge and experience in web-based application and /or website user interface designing and publishing; • Excellent knowledge on the responsive designing web/mobile application, wire-framing, prototyping, designing. • Must have work experience in more than 5 government related website or web applications; • Develop UI mockups and prototypes that clearly illustrates how system will function and look alike. 	<ul style="list-style-type: none"> • Develop ideas using business processes and workflows and also graphic user interface elements, like menus, tabs and widgets, • Creating original graphic designs (e.g., images, sketches and tables), • Identify and troubleshoot UX problems (e.g., responsiveness) and fix them, • Responsible for designing the graphical user interfaces for NEMIS web portal, registration/intake system, business reporting portal and administration/ management for NEMIS System. • Prepare and present rough drafts to internal teams and key stakeholders. • Conduct layout adjustments based on stakeholder's feedback, • Other activities as per needed to build the system
<p>10 <u>Database Administrator</u></p>	<ul style="list-style-type: none"> • At least Bachelor's degree in IT related fields; • Master degree in the Computer Science with the Bachelor's Degree in IT equivalent is more preferable; • At least 10 (ten) years of demonstrated knowledge and experience in installing, configuring and tuning MIS/IT systems similar to the project size and nature; • Strong knowledge and experience of RDBMS such as MySQL, MS SQL, Oracle including knowledge of Operating systems such as Windows Advance Server, Linux or equivalent; • At least 5 experiences in development of enterprise application for government agencies as database administrator • OCA/OCF certification is an advantage. 	<ul style="list-style-type: none"> • Responsible for installation, setup and creation of databases management systems in windows and /or Linux system, • Set up and configuration of database system in datacenter, disaster recovery system and /or failover system, • Creating, updating and for modifications to database structure and data models, • Monitoring database and patch upgradation, • Ensuring database security, integrity, stability and system availability of the system i.e., designing and defining the strategies for backup, fast recovery etc., • Responsible for creating custom scripts for data migration, update and data mapping, • Other activities as per needed to build the system

11	<p><u>Senior Software Developer / Software Developer</u></p> <ul style="list-style-type: none"> • At least Bachelor's degree in IT related fields; • Master's Degree in the Computer Science with the Bachelor's Degree in IT equivalent is more preferable; • At least five years of demonstrated knowledge and experience for Senior Software Developer and at least two years of experience for Software Developer in design and development of enterprise standard web based software and mobile apps. • Internationally recognized certificates on the Enterprise level software development will be added point • Experience in the technology platforms like .NET/Java/Python; • Strong knowledge and experience in RDBMS systems such as MySQL, PostgreSQL, Oracle, MSSQL or equivalent. 	<ul style="list-style-type: none"> • Produce clean and efficient code based on specifications, data dictionary, business process and workflows and verify, deploy the software programs, • Responsible for understanding project requirements, and develop the application modules to meet the requirements as provided in the Software Design Documents. • Develop the custom scripts to integrate the several sub-systems using the robust database management system. • Ensure the compliance of the NEMIS system with Government Enterprise Architecture (GEA) Compliance and NEGIF. • Develop the NEMIS system capable of integrating with third-party libraries and APIs, consuming REST Web Services, • Other activities as per needed to build the system
12	<p><u>Senior Mobile App Developer</u></p> <ul style="list-style-type: none"> • At least Bachelor's degree in IT related fields; • Master's Degree in the Computer Science with the Bachelor's Degree in IT equivalent is more preferable; • Minimum 5 Project Experiences; • Should have a good understanding of embedding Mobile device features within the App such as local storage, Authentication etc. • Responsible for Unit design and coding. • Responsible for implementing and following standards and guidelines with best coding practices. • Knowledge of Web services, JSON APIs, Angular JS is a must for extending back-end systems on to the mobile app. 	<ul style="list-style-type: none"> • Responsible for selecting the mobile app development tools and technologies both for front-end and back-end, • Responsible for understanding project requirements and develop the mobile application modules to meet the requirements as provided in the Design Documents. • Designing, implementing, and managing software programs, • Writing high-quality source codes for mobile apps both for iOS and Androids platforms • Work with developers and architects, to ensure bug-free and timely delivery of allocated development tasks. • Develop the mobile app capable of integrating with third-party libraries and APIs, consuming REST Web Services, • Other activities as per needed to build the system
13	<p><u>Senior PHP Developer</u></p> <ul style="list-style-type: none"> • At least Bachelor's degree in IT related fields; • At least 5 (five) years of demonstrated work experience in software development using combination of PHP Laravel framework as 	<ul style="list-style-type: none"> • Perform code review, troubleshoot the frontend/ backend issues and build upon the existing design and programming techniques to make the current EMIS system fully functional and user friendly;

	<p>backend tool and MySQL database; client references must be provided;</p> <ul style="list-style-type: none"> • Should have a strong knowledge of system analysis, RDBMS concepts and IT project implementation life cycle; • Experience of working in government projects will be an advantage; • Preference shall be given to the candidate experienced in similar job as mentioned in the Scope of Work; 	<ul style="list-style-type: none"> • Independently create/ establish in-house development environment in PHP Laravel framework and MySQL database to access the available source code files and build upon, • Analyze business processes and provides technical solutions, • Generation of dynamic reports from the system as required by the ministry. • Perform monitoring of the current system and provide update information to PMEP IT team. • Perform important role in the migration of current system to NEMIS Platform, • Other activities as per needed to build the system
<p>14</p>	<p><u>BI/Data Analyst</u></p> <ul style="list-style-type: none"> • At least Bachelor's degree in IT related fields; • Master's Degree in the Computer Science with the Bachelor's Degree in IT equivalent is more preferable; • 5 years of experience in Data Analysis/Business Intelligence System; • At least 3 project experiences in development of Data Analysis / Business Intelligence features; • Internationally recognized certificates on the data analysis/database system will be an added point. 	<ul style="list-style-type: none"> • Understanding of the data and different data analysis techniques for detail analysis of captured data and develop required visualization; • Assess visualization tools – open source and commercial tools to provide reference for better visualization of extracted data; • Designing the Business Intelligence System architecture with all technical detailing for e.g., collecting the business logs, fact tables, trend tables and also representation of reports, publishing the dashboards, charts and reports with multi-dimension of indicators, • Create data model designs and/or Stored Procedures, • Build dashboards and tools, craft analyses, and tell stories with data to help our teams make better decisions, • Setup the BI System, test and train the end users, • Shall migrate the current EMIS data to the new database architecture. • Setup the BI System, test and train the end users. • Other activities as per needed to build the system
<p>15</p>	<p><u>Quality Assurance Analyst</u></p> <ul style="list-style-type: none"> • At least Bachelor's degree in IT related fields; • At least Two (2) years of demonstrated knowledge and experience in software quality 	<ul style="list-style-type: none"> • Defining the test scenarios and test cases to ensure the quality, maturity level and robustness of the system,

	<p>assurance, test case development and quality control for software projects;</p> <ul style="list-style-type: none"> Professional certification/training certification in Quality assurance/software testing Strong knowledge and experience in the technology platform proposed by the consulting firm. Strong knowledge and experience in software programming tools & use of quality assurance & testing tools 	<ul style="list-style-type: none"> Ensure the enterprise level quality of the code. Perform different types of tests (unit test, integration test, regression test, user acceptance test, etc.), Verification of developed system to confirm business requirements of the projects, Other activities as required by the PMU
16	<p><u>System / Network Administrator</u></p> <ul style="list-style-type: none"> At least Bachelor's Degree in IT related Field having Minimum 3 years of experience in Related Field Professional certification/training certification in RedHat/Linux/Networking Experience in LAN/WAN/Internet services administration Strong understanding of DNS and NFS, SMTP, HTTP, TCP/IP Working experience on firewalls, IPS, email security, WAF, NAC etc. would be preferred. 	<ul style="list-style-type: none"> Monitor, Maintain & Manage servers. Monitor and test application performance for potential bottlenecks, identify possible solutions and work with other team members to implement those fixes. Proactively ensure the highest levels of systems and infrastructure availability. Maintain security, software backups, and assist in preparing redundancy strategies. Write and maintain custom scripts to increase system efficiency and lower the human intervention time on any tasks. Manage and monitor all installed network systems and infrastructure. Perform R&D work on any given task related Configure, test, and maintain operating systems, application software, and system management tools.
17	<p><u>Ethical Hacker</u></p> <ul style="list-style-type: none"> Bachelor's degree in Information Technology or Computer Science or equivalent. Certified Ethical Hacker Certification. Minimum 3 years of work experience as a Certified Ethical Hacker. Advanced knowledge of networking systems and security software. In-depth knowledge of parameter manipulation, session hijacking, and cross-site scripting. Technical knowledge of routers, firewalls, and server systems. 	<ul style="list-style-type: none"> Conducting multiple penetration tests on the system. Identifying and recording security flaws and breaches. Identifying areas of high-level security. Reviewing and rating the security network. Creating suggestions for security upgrades. Compiling penetration test reports for the client. Conducting penetration tests once new security features have been implemented. Suggesting alternate upgrades.
18	<p><u>Training Expert</u></p> <ul style="list-style-type: none"> At least Bachelor's degree in related fields; 	<ul style="list-style-type: none"> Preparation and presentation of training plan, training schedule and training materials, Organization of all trainings specified in requirements.

	<ul style="list-style-type: none"> • At least have five years of demonstrated knowledge and experience in providing training to trainers and end users with presentation and demonstration of the software. • Recognized certificates in training will be an advantage. 	<ul style="list-style-type: none"> • Provide MToT. • Conducting the training evaluation of trainees, collecting the training feedback and adapting the improvements, • Other activities as required by the PMU
19	<p><u>Documentation Expert</u></p> <ul style="list-style-type: none"> • At least Bachelor's degree in related fields with strong knowledge of ICT; • Must have documented more than 5 government related ICT projects; • Good communications and inter personal skills and fluency in written and spoken English 	<ul style="list-style-type: none"> • Development of quality technical documentations and user manuals; • Development of user manuals in English and Nepali language as well looking as possible requirement of development of user manuals in local language. • Preparation of mandatory documents or artifacts mentioned in GEA and NeGIF, • Other activities as required by the PMU
20	<p><u>Call Support</u></p> <ul style="list-style-type: none"> • At least Bachelor degree in any stream • Good communications and inter personal skills and fluency in written and spoken English • Understand the technical terms • Preferably 1 -2 years of experience in Call support in IT field. 	<ul style="list-style-type: none"> • Support technical call of the EMIS • Preparation of Call Logs • Inform the critical issues of EMIS to the IT team • After the deployment of the NEMIS full call support should be provided for the developed system • Other activities as required by the PMU

Table 3: Qualification and Experience of Experts

18. Top Level Implementation Schedule

The following is the outline of the implementation schedule for the consulting firm to get a sense of the key tasks and activities and the proposed timeline. The consulting firm may propose their own tasks and lists of activities in the best possible manner, however, must meet the following timeline. Every iteration module should be piloted first then improvement must be done from the feedbacks.

S. N.	Key Activities/ Milestones	M1	M2	M3	M4	M5	M6	M7	M8	M9	M10	M11	M12	M13	M14	M15	M16	M17	M18	M19	M54	
1.	Discovery sessions and Research	■	■																							
2.	Project Kick-off meeting	■	■																							
3.	Project Inception Report with the system requirement specification document	■	■																							
4.	Business Requirement Analysis Document (BRD)			■	■																					
5.	EMIS Gap Analysis document			■	■																					
6.	Solution/ System Design Document (SDD)			■	■	■																				
7.	Iteration: Mock-up design and prototype Demonstration			■	■	■	■																			
8.	Hardware, IT Equipment and Logistics document			■	■	■	■																			
9.	EMIS Data migration Report						■	■	■																	
10.	Iteration: System and Mobile App development and Integration							■	■	■	■	■	■	■	■	■	■	■	■	■	■					
11.	Iteration: Deployment in SIT/UAT Environment and Sanity checks										■	■	■	■	■	■	■	■	■	■	■					
12.	Iteration: End user training and System user trainings															■	■	■	■	■	■					
13.	Manuals - End user and system administration documents															■	■	■	■	■	■					
14.	User Acceptance Testing (UAT) and System Integration Testing (SIT)															■	■	■	■	■	■					
15.	MToT / ToT Trainings and Manuals															■	■	■	■	■	■					
16.	Production environment readiness and deployment															■	■	■	■	■	■					
17.	Carry out all the activities as per the standards and guidelines provided by Government Enterprise Architecture (GEA) and NeGIF.	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■
18.	Maintenance and Support with enhancement as per requirement and feedback																				■	■	■	■	■	

