Model Curriculum

QP Name: Genetic Counsellor

QP Code: HSS/Q8705

QP Version: 3.0

NSQF Level: 6.5

Model Curriculum Version: 1.0

Healthcare Sector Skill Council || Healthcare Sector Skill Council,520, DLF Tower A, 5th Floor, Jasola District Centre, New Delhi – 110025

Contents

Training Parameters

Sector	Healthcare
Sub-Sector	Social Work & Community Health
Occupation	Counselling
Country	India
NSQF Level	6.5
Aligned to NCO/ISCO/ISIC Code	NCO/2015/2635
Minimum Educational Qualification and Experience	UG Degree completed (Medical Graduate (MBBS/ BHMS/ BAMS/ BUMS)/Graduate (Nursing/ Allied Health Professionals)/BDS/life sciences/clinical psychology/ B. Tech Biotechnology or genetics)
Pre-Requisite License or Training	Not Applicable
Minimum Job Entry Age	23 Years
Last Reviewed On	08/05/2025
Next Review Date	08/05/2028
NSQC Approval Date	08/05/2025

QP Version	3.0
Model Curriculum Creation Date	08/05/2025
Model Curriculum Valid Up to Date	08/05/2028
Model Curriculum Version	1.0
Minimum Duration of the Course	1200 Hrs.
Maximum Duration of the Course	1200 Hrs

Program Overview

This section summarizes the end objectives of the program along with its duration.

Training Outcomes

At the end of the program, the learner should have acquired the listed knowledge and skills.

- Describe the basic concepts of human genetics and genomics.
- Gather patient's history and draw detailed pedigree charts with the use of obtained medical history.
- Determine the mode of inheritance and risk of occurrence and recurrence of the genetic condition/birth defect after gathering patient history.
- Interpret and explain the results of genetic tests, the diagnosis, etiology, natural history, monitoring and management of a genetic disorder.
- Provide counseling for reproductive options including prenatal diagnosis and anticipatory guidance.
- Demonstrate sound knowledge of the utility of different genetic tests and their limitations.
- Identifying high risk members and facilitating extended family screening.
- Demonstrate the skills necessary to successfully manage a genetic counseling case.
- Facilitate informed decision making in selecting genetic tests and management/ treatment methodology.
- Demonstrate knowledge of various genetic technologies which can help diagnose diseases, understand how genes affect our lives, and develop treatments
- Promote awareness on the importance of the psychosocial impact of human genetic technology among patients, health and social care professionals and the wider society.
- Maintain a safe, healthy, and secure working environment.
- Follow biomedical waste disposal and infection control policies and procedures in the healthcare organization.
- Maintain interpersonal relationships with co-workers, patients, and their family members.
- Maintain professional and medico-legal conduct at all times in accordance with legislation, protocols and guidelines set up by the healthcare provider.
- Keep abreast of the latest technologies and future opportunities of broadening the scope of work in context of recent advancements in human genomics and genetic counselling.
- Apply genomics in different medical specialties, personalized/precision medicine and disease research.

Compulsory Modules

The table lists the modules and their duration corresponding to the Compulsory NOS of the QP.

NOS and Module Details	Theory Duration	Practical Duration	On-the-Job Training Duration (Mandatory)	Total Duration
HSS/N8713: Collect detailed patient and family history to draw a pedigree	**87:00**	**60:00**	**63:00**	**210:00**
Module 1: Introduction to healthcare delivery systems and Role of Genetic Counselor	15:00	07:00	00:00	17:00
Module 2: Structure, functions and development of human body	15:00	08:00	00:00	23:00
Module 3: Principles of Human Genetics and Genomics	36:00	20:00	00:00	76:00
Module 4: Patient & Family History and Pedigree Analysis	21:00	25:00	00:00	49:00
HSS/N8714: Assess risk for genetic disorders or syndromes	**30:00**	**30:00**	**60:00**	**120:00**
Module 5: Categories of genetic diseases	10:00	8:00	00:00	18:00
Module 6: Risk assessment for selecting Prenatal and Pre-implantation genetic tests	20:00	22:00	00:00	42:00
HSS/N8715: Provide counselling on various genetic tests and coordinate for their execution	**09:00**	**30:00**	**00:00**	**39:00**
Module 7: Screening and diagnostic testing methodology and counselling	09:00	30:00	00:00	39:00

HSS/N8716: Interpret the inferences of the genetic tests and carryout post-test counselling	**27:00**	**60:00**	**60:00**	**150:00**
Module 8: Chromosome studies, Cytogenetics, FISH and Microarray	21:00	30:00	00:00	51:00
Module 9: Documentation and record keeping in genetics	06:00	30:00	00:00	36:00
HSS/N8717: Provide need-based genetic counselling to the patient and their family members	**186:00**	**135:00**	**60:00**	**381:00**
Module 10: Adult genetic counseling	26:00	15:00	00:00	41:00
Module 11: Developmental, reproductive and infertility genetics	26:00	15:00	00:00	41:00
Module 12: Paediatric counseling	26:00	15:00	00:00	41:00
Module 13: Cancer genetic counseling	26:00	15:00	00:00	41:00
Module 14: Neurogenetics and psychiatric genetics	26:00	15:00	00:00	41:00
Module 15: Application of genetic counseling in different medical specialties	10:00	15:00	00:00	25:00
Module 16: Process of genetic counseling	26:00	15:00	00:00	41:00
Module 17: Interpersonal, psychosocial, and soft skills in genetic counselling	10:00	15:00	00:00	25:00
Module 18: Ethical, legal and philosophical principles in genetic counselling	10:00	15:00	00:00	25:00
HSS/N8718: Promote genetics related awareness	**36:00**	**90:00**	**54:00**	**180:00**

Module 19: Population genetics	10:00	18:00	00:00	28:00
Module 20: Culture and ethnicity	06:00	15:00	00:00	21:00
Module 21: Community awareness in genetic counseling	10:00	30:00	00:00	40:00
Module 22: Genetics awareness at hospital level	10:00	28:00	00:00	38:00
HSS/N9620: Comply with infection control and biomedical waste disposal policies	**15:00**	**15:00**	**00:00**	**30:00**
Module 23: Infection control policies and procedures	05:00	05:00	00:00	10:00
Module 24: Bio-medical waste management	05:00	05:00	00:00	10:00
Module 25: Personal Hygiene	05:00	05:00	00:00	10:00
Total	**390:00**	**420:00**	**300:00**	**1110:00**
Module 26: Employability Skill (90 Hours) mapped to DGT/VSQ/N0103	90:00	00:00	00:00	90:00
Total	**480:00**	**420:00**	**300: 00**	**1200:00**

Module Details

Module 1: Introduction to healthcare delivery systems and role of genetic counselor

Mapped to: HSS/N8713

Terminal Outcomes:

- Describe the basic structure and function of healthcare delivery system in India with respect to various levels, patient care, and set-ups.
- Describe the key roles and responsibilities of a genetic counselor

Duration: *15:00*	**Duration**: *07:00*
Theory – Key Learning Outcomes	**Practical – Key Learning Outcomes**
Key Components of a Healthcare System ● Discuss about the healthcare delivery system in India at primary, secondary, tertiary, and quaternary level. ● Distinguish between private, public, and non-profit healthcare delivery systems. **Hospital Departments and Comprehensive Services offered** ● Explore the variety of patient care services provided within a hospital setting. ○ Inpatient Services: Acute care, Surgical services, Intensive care units (ICU). ○ Outpatient Services: Emergency services, Outpatient clinics, Day surgery units. ○ Diagnostic and therapeutic services: Imaging services, laboratory services, Rehabilitation services. ○ Support Services: Pharmacy, nutrition and dietetics, palliative and Hospice care ● Describe the various departments within a hospital and their roles. ○ Clinical Departments ○ Diagnostic departments ○ Support Departments ○ Administrative departments ● Understand how various hospital departments collaborate to provide integrated patient care. ○ Interdisciplinary team meetings ○ Patient flow management ○ Case management ○ Electronic health Records (EHR) **Introduction to human genetics department/systems/organizations** ● List different organizations in India which offer genetic counselling facilities like fertility clinics, genetic testing laboratories, research institutions, and genetic counseling clinics/ departments in various public or private healthcare organizations at district, state or central levels. ● Explore country specific licensing requirements and professional standards for genetic counselors. **Roles and responsibilities of genetic counselors** ● Discuss the role of a genetic counselor in the following broad areas of work:	● Plan a field visit to organizations such as genetics departments, clinics etc. ● Prepare a report summarizing the basic structure and function of healthcare delivery system in India. ● Prepare a hierarchical chart of different career options at various healthcare settings. ● Create a flow chart depicting roles and responsibilities of a genetic counselor at different sites. ● Demonstrate effective interaction with other professionals to promote appropriate implementation of genetic services.

○ identifying individuals at risk for genetic disorders, ○ providing information about genetic testing, ○ explaining complex genetic results, ○ assessing the implications of those results on individuals and families, and ○ offering psychosocial support to help them cope with the information and potential decisions related to their genetic risk ● Explain the role and responsibilities of the genetic counselor at different specialty clinical sites depending on their specialization such as, pre-natal, paediatric, adult genetics, reproductive, cancer, and general genetics, cardiovascular genetics, metabolic disorders, neurogenetics, etc. ● Distinguish between the scope of practice of a genetic counselor and that of other healthcare professionals such as medical geneticists. ● Discuss the roles of multi-disciplinary genetics team personnel. ● Discuss the history of genetics and development of genetic counselors in India. ● Explain challenges and limitations of genetic counselors including the limits of competence and authority ● Understand the role of Telemedicine and Digital Platforms for Genetic Counselling. ● Understand the role of Pharmacogenomics in genetic counselling. ● Understand the contribution of Genetic Counselor in personalized medicine by helping individuals and families understand genetic information, interpret test results, and make informed decisions about healthcare, treatment, and prevention, ultimately tailoring medical care to an individual's unique genetic profile ● Keep oneself updated with the latest trends and technology as per the scope of work.	
Classroom Aids:	
Charts, Models, Video presentation, Flip Chart, White-Board/Smart Board, Marker, Duster.	
Tools, Equipment and Other Requirements	
Document and guidelines with detailed role description and limitations.	

Module 2: Structure, functions and development of human body

Mapped to: HSS/N8713

Terminal Outcome:

- Apply the knowledge of basic structure and function of the various body systems and its associated components during assistance to healthcare services provider.
- Apply the knowledge of cell biology, developmental biology and embryology while practicing.

Duration: *15:00*	**Duration**: *08:00*
Theory – Key Learning Outcomes	**Practical – Key Learning Outcomes**
Basic Structure and Function of Human Body ● List various body parts in a human. ● Explain the organization of body cells, tissues, organs, organ systems, membranes, and glands in the human body. ● Describe different types of organ systems. ● Describe basic function of vital organs. ● Discuss different types of body fluids, secretions, and excretions. **Cell Biology** ● Describe parts and functions of each human Cell ● Define & classify surface and glandular epithelium and list its functions and type with examples ● Classify and list functions of connective tissue. ● Discuss gametogenesis (oogenesis, spermatogenesis, meiotic disturbances, cause for teratoma) and microscopic structure of uterus. ● Discuss the cell cycle, phases of the cell cycle, mitosis and meiosis, stages in mitosis and meiosis ● Explain the significance of cell division processes (mitosis and meiosis) in development and inheritance. **Developmental Biology (Human Development)** ● Discuss basic principles and concepts of developmental biology such as introduction to the evolution of the body plan: acoelomate to coelomate, diploblastic and triploblastic organization of body plan; introduction to information flow from mother to egg; different sized embryos, yolk density and cleavage patterns; transition from a plastic, uncommitted state to a determined and then differentiated state ● Discuss basic principles and concepts of embryology outlining key stages of human development, from zygote to adulthood including fetal development, developmental milestones, physical and psychological development. ● Understand the role of genetic and environmental factors in normal and abnormal development.	● Identify different parts of the body using charts and models. ● Explain the structure and functioning of human body systems using charts and models. ● Design various working models depicting the functioning of human body systems. ● Visit genetic testing lab and observe following sample slides of: ○ Different types of tissue ○ Stages of Gametogenesis ○ Microscopic structure of uterus

Classroom Aids:
Charts, Models, Video presentation, Flip Chart, White-Board/Smart Board, Marker, Duster.
Tools, Equipment and Other Requirements
3D models of human body and accessory organs, model human skeletal system, organ specimen.

Module 3: Principles of Human Genetics and genomics
Mapped to: HSS/N8713

Terminal Outcome:

- Differentiate between human and medical genetics.
- Develop a deeper understanding of various concepts related to human and medical genetics.
- Apply the basic principles and concepts of human genetics

Duration: *36:00*	**Duration**: *20:00*
Theory – Key Learning Outcomes	**Practical – Key Learning Outcomes**
Foundational Concepts of Human genetics • Discuss the concepts of human genetics: definition of heredity and terminology used in the study of genetics; history and significance of the study of genetics; the different branches of genetics including an introduction to genetic diversity and evolution; the future of genetics. • Explain the concept of genes or genomes related to phenotypes and human pathophysiology. • Explain the structure and function of chromosomes, genes, DNA, RNA and proteins in cellular processes. • Discuss the process of DNA and RNA replication, transcription, translation, etc • Recognize how genetic information influences the development and structure of the human body. • Describe the role of genes in organ formation and differentiation. • Differentiate between Mendelian and Non-Mendelian characteristics • Provide an Overview of cytogenetics: Implications of structural and numerical chromosomal variations. • Emphasize on Sex Chromosomes: Sex linked, sex influenced and sex-limited inheritance; sex determination. • Explain in brief the various other genetic related terminologies and its basic concepts including, gene regulation, human genome and chromatin organization, transcriptomics, epigenomics, and metagenomics, genome imprinting, gene mutation and repair. • Explain in brief how the advancements in genomic technologies, including CRISPR-Cas9 gene-editing, are driving research in areas like gene regulation, genome function, and nucleic acid synthesis. **Foundational Concepts of Medical genetics** • Discuss various types of gene mutations and discuss how it can lead to structural or functional abnormalities. • Discuss human genome organization, annotations and databases, markers	• Prepare a chart depicting differences in Mendelian and non-Mendelian inheritance patterns. • Draw the diagrams of chromosomes, DNA and RNA differentiating their basic frameworks. • Prepare visual representations of processes of transcription and translation. • Research and present more information on various terminologies and concepts of human genetics in groups: cytogenetics, sex chromosomes, gene regulation, human genome and chromatin organization, epigenetics, genome imprinting, gene mutation and repair. • Prepare a report/research work to analyze the application of genetic engineering, modifications and its implications on the environment and society. • Prepare a report/research work to demonstrate the process of identifying phenotypes or physical attributes of people. • Create charts of various inheritance patterns such as sex-linked, X-linked, polygenic inheritance. • Research and prepare presentation on case studies eliciting benefits of genetics in study of genetic disorders: etiology, clinical features and disease expression, natural history, differential diagnoses, genetic testing and interpretation, pathophysiology, recurrence risk and management.

(microsatellites, SNPs). ● Explain mitochondrial genome and disorders. ● Differentiate between the concept of human and medical genetics. ● Correlate genotype-phenotype and factors that influence the same. ● Discuss the multifactorial and threshold trait. ● Explain genetic susceptibility & risk factors. ● Explain the concept of pharmacogenomics, Eco genomics, metabolomics, teratogenesis. ● Discuss allele frequency in population and estimation of carrier frequency. ● Explain the principles of inheritance and probability rules such as polygenic inheritance. ● Differentiate between the sex-linked and X- linked inheritance patterns. ● Explain the concept of Mosaicism, dynamic mutations, imprinting, maternal inheritance, multifactorial inheritance. ● Explain single-gene and complex inheritance. ● Discuss the autosomal patterns of inheritance. ● Correlate mutations and chromosomal abnormalities to disease. ● List various molecular defects that lead to various classes of genetic disease. ● Discuss in brief the biochemical testing. **Application of principles of human and medical genetics** ● Describe the principles of human, medical, and public health genetics, and their related sciences. ● Describe the principles of genetics and their contribution to etiology, clinical features and disease expression, natural history, differential diagnoses, genetic testing and interpretation, pathophysiology, recurrence risk and management of genetic diseases. ● Explain the fundamentals of population and quantitative genetics. ● Outline the application of genetics in prenatal, pediatric, adult, personalized genomic medicine, cytogenetics, biochemical, molecular medicine, cardiovascular, neurogenetics, pharmacogenetics and psychiatric genetics. ● Discuss the roles of Genomics in Disease research by identifying genes associated with diseases, creating targeted therapies, and improving diagnostic tools for conditions like cancer, cystic fibrosis, and Alzheimer's disease. ● Discuss the functional impacts of Genetic Variations and disease susceptibility. ● Explain how genetic conditions can affect the structure and function of the body. ● Discuss a few examples of common genetic disorders and their anatomical or physiological manifestations (e.g., cystic fibrosis, Down syndrome). ● Discuss the role of Artificial Intelligence (AI) helps analyze complex genetic data, identify patterns, and predict disease risks.	

Classroom Aids:
Charts, Video presentation, Flip Chart, White-Board/Smart Board, Marker, Duster.
Tools, Equipment and Other Requirements
Computer with internet facility and latest version of software and access to research publications.

Module 4: Patient & Family History and Principles of Human Genetics and genomics

Mapped to: HSS/N8713

Terminal Outcome:

- Conduct interviews and obtain family history.
- Evaluate medical records and elicit medical history.
- Construct a pedigree.
- Assess inheritance patterns using pedigree analysis.

Duration: *21:00*	**Duration**: *25:00*
Theory – Key Learning Outcomes	**Practical – Key Learning Outcomes**
Patient History • Discuss various communication and interviewing skills to elicit a family history and pursue a relevant path of inquiry. • Describe the significance of medical, developmental, pregnancy and psychosocial histories in pedigree analysis and risk assessment. • Explain the concept of developmental, perinatal, family history. • Discuss the process of obtaining medical history. • Describe the importance of evaluating medical records and the process of identifying pertinent information from them. • Discuss the importance of integrating medical, laboratory and pertinent genetic and non-genetic information in case history. • some studies of twins to assess the importance of genes and environment. **Pedigree Analysis** • List various symbols used in drawing pedigree charts and their meaning. • Explain pedigree construction & family study. • Describe the complications in pedigree analysis such as variable expressivity, heterogeneity, penetrance, anticipation, epigenetics, Mosaicism, autosomal recessive traits, autosomal dominant traits, X- linked recessive traits, X- linked dominant traits and Y-linked traits. • Discuss ways of analysis of pedigrees and interpretation of pedigree analysis • Discuss the process of clinical case preparation. • Discuss some studies of twins to assess the importance of genes and environment. **Risk Assessment** • Explain the methodology of risk evaluation- Mendelian risk, empirical risk. • Describe various methodologies of mapping and identification of disease genes such as linkage analysis, LOD score, and association study. • Identify relevant information about environmental and lifestyle factors into risk assessment. • Identify teratogens, exposure and other non-genetic risk factors	• Formulate structured questions for sample individual cases regarding medical history and/or potential diagnoses to draw pedigree. • Draw sample pedigree charts with the use of pedigree symbols, standard notation, and nomenclature. • Demonstrate the method of assessing sample genetic risk. • Review sample profiles to extract information related to medical, developmental, pregnancy and psychosocial histories. • Demonstrate recording morphological features and anthropometry and documentation of the findings, including photographs.
Classroom Aids:	
Charts, Models, Video presentation, Flip Chart, White-Board/Smart Board, Marker, Duster	
Tools, Equipment and Other Requirements	

Sample pedigree charts, pedigree symbol charts

Module 5: Categories of Genetic Diseases
Mapped to: HSS/N8714

Terminal Outcome:

- Describe various types of genetic diseases and anomalies.

Duration: *10:00*	**Duration**: *08:00*
Theory – Key Learning Outcomes	**Practical – Key Learning Outcomes**
• Discuss various single gene abnormalities such as autosomal dominant, autosomal recessive, X- linked, mitochondrial and imprinting. • Discuss various chromosomal abnormalities: Numerical (polyploidy, aneuploidy, autosomal), structural (deletion, duplication, translocation), microdeletions etc. • Discuss the single gene disorders abnormalities such as Cystic Fibrosis, Marfan's syndrome. • Discuss the multifactorial genetic abnormalities such as Diabetes, Atherosclerosis, Schizophrenia. • Explain the significance of mutations in either breast cancer gene, BRCA1 or BRCA2. • Discuss different acquired somatic abnormalities. • Discuss the rare cases where there is imprinting of a gene dependent on which parent it is inherited from, e.g. SDHD mutation • Discuss basics of making observations and the process of their interpretation to arrive at differential diagnosis and further testing to confirm a diagnosis • Discuss differential diagnosis of common presentations in genetic disorders.	• Demonstrate the method of identifying physical attributes associated with various genetic disorders. • Research and prepare report on various types of genetic diseases and anomalies along with their prevalence in India and other countries, clinical features, natural history, etiology, mode of inheritance, risk factors, diagnostic processes, treatment and management options.
Classroom Aids:	
Charts, Models, Video presentation, Flip Chart, White-Board/Smart Board, Marker, Duster	
Tools, Equipment and Other Requirements	
Charts of various disorders and their symptoms	

Module 6: Risk assessment for selecting Prenatal and Pre-implantation genetic tests

Mapped to: HSS/N8714

Terminal Outcome:

- Discuss various pre-implantation and pre-natal genetic screening and diagnostic tests.
- Describe legal and ethical issues surrounding pre-natal genetic testing.
- Assess the probability/ risk of a genetic condition or carrier status
- Identify suitable genetic/predictive tests
- Carry out pre-test counselling

Duration: *20:00*	**Duration**: *22:00*
Theory – Key Learning Outcomes	**Practical – Key Learning Outcomes**
Pre-implantation and pre-natal genetic screening and diagnostic tests • Discuss the principles of prenatal diagnosis, different modalities available for prenatal diagnosis • List available diagnostic tests for prenatal and pre-implantation diagnosis • Explain the different types, benefits, and applicable limitations of prenatal and pre-implantation genetic screening tests. • Describe the first, second and third trimester screening and combined screening of all trimesters. • Describe the non-invasive techniques of diagnosis such as Triple test, Ultrasonography (USG), cell-free DNA testing etc along with its timelines. • Describe the invasive techniques of diagnosis such as Amniocentesis (AC), chorionic villi sampling (CVS), Fetal Blood Sampling (FBS) along with its timelines. **Genetic test options** • Describe specific considerations relevant to genetic versus genomic and clinical versus research testing • Discuss various aspects taken into consideration during selection of appropriate screening and diagnostic genetic testing options such as availability, analytic and clinical validity, clinical utility, potential benefits, risks, limitations, sensitivity, specificity, and costs etc • Describe the importance of carrying out pre-symptomatic genetic testing • Discuss the process and importance of conveying important information to other team members involved in the care of patients • Identify accuracy and reliability of various diagnostic tests • Discuss the basic principles and methodologies of common genetic test procedures • Demarcate between teratogenic versus genetic causes of disease conditions • Discuss the utility of carrier screening,	**Risk Assessment** • Demonstrate the process of preparing a sample schedule of a potential candidate. • Draft standard questions for assessing the probable risk of a genetic condition such as pregnancy history, current and past pregnancies, births and miscarriages, terminations or abortions and pregnancy complications. • Demonstrate the process of obtaining informed consent for procedures. • Demonstrate the process of interviewing clients. • Demonstrate assessment of the risks of an inherited disorder in a sample case study using previously captured information, data based on pedigree analysis, inheritance patterns, genetic epidemiology, genetics principles, quantitative/ mathematical calculations. **Genetic Test Selection** ○ Prepare a presentation listing various screening, diagnostic and predictive genetic tests required to be performed for a patient/family ○ Perform a sample case study evaluating various genetic testing options such as screening, diagnostic and genomic genetic tests as per patient's feasibility based on history, clinical findings and course of the disease **Pre-test counselling** • Demonstrate addressing queries related to the pre-natal tests in sample case scenarios. • Demonstrate filling various sample forms/ formats required.

segregation analysis and parental analysis prior to planning subsequent pregnancies ● Discuss when to consider whether CRISPr might be used for prenatal treatment and ethics of its use. ● Discuss the criteria to determine what conditions warrant prenatal diagnosis and discuss the regulations behind this. ● Identify broad disease groups where the diagnosis is not apparent ● Discuss the selection procedure of most appropriate person to test, type of test and timing of test. **Pre-test counselling** ● Discuss the importance of non-directive, non-paternalistic and non-judgmental approach when counseling the patients and relatives ● Discuss the concept of non-maleficence ● Describe standard features of a pre-natal counselling session such as reviewing patient/ partner's medical, pregnancy and family history, identification of risks etc. ● Explain the significance of assessing psychological problems or needs of the patients of families like fear, stress, stigma, marital conflicts, etc. ● Explain the significance of different standard results of prenatal screening tests. ● Explain the significance of history of infertility, multiple miscarriages, or stillbirth. ● Discuss the importance of obtaining general information about the conditions being tested for, including variability and common features ● Describe the concept, significance, and process of informed decision. ● Describe the methodology of interpreting prenatal and pre-implantation screening test results. ● Describe the process of providing information about the risks of chromosomes abnormalities, birth defects or other genetic conditions to individuals, couples, or at-risk families. ● Discuss the criteria of referrals for consultations with relevant specialties for investigations, and pre-test counseling.	● Demonstrate the use of verbal and non- verbal communication to provide emotional support during a mock counselling session. ● Use appropriate and non-judgmental counselling techniques such as listening to facilitate the decision-making process and make informed choices about prenatal screening and testing options ● Create a sample plan of referrals for consultations with relevant specialties and investigations, and pre-test counseling. ● Perform a role play apprising the patients and the family members about the following: ○ aspects of all types of screening and diagnostic genetic testing options such as availability, analytic and clinical validity, etc. ○ etiopathogenesis, common clinical presentations, anticipated courses of disease, complications, management and differential diagnosis of common presentations in genetic disorders ○ The possibility of likely genetic disorder and plan of required investigations for reaching a diagnosis ○ various procedures performed for prenatal sample collection e.g. amniocentesis, chorionic villus biopsy, umbilical cord blood sampling ○ procedure to carry out predictive genetic testing ○ the nature, type, and prognosis of genetic diseases based on preliminary findings
Classroom Aids:	
Charts, Models, Video presentation, Flip Chart, White-Board/Smart Board, Marker, Duster	
Tools, Equipment and Other Requirements	
Instructional videos on procedure of Amniocentesis, FISH etc.	

Module 7: Screening and Diagnostic testing methodology and counselling
Mapped to: HSS/N8715

Terminal Outcome:

- Differentiate between screening and diagnostic tests.
- Provide detailed information on various aspects of pre-natal and post-natal screening/diagnostic genetic diseases.
- Coordinate with the appropriate specialist/ medical geneticist to carry out identified confirmatory diagnostic genetic test.

Duration: *09:00*	**Duration**: *30:00*
Theory – Key Learning Outcomes	**Practical – Key Learning Outcomes**
• Discuss the concept of Variant of Uncertain Significance (VUS). • Discuss the various genetic diseases or the mutations obtained through Next Generation Sequencing (NGS), Complete Human Genome Sequence or any such genetic test. • Provide a brief outline of the PNDT Act and ACMG guidelines. • Compare different types of testing: diagnostic testing, carrier testing, prenatal testing, pre-implantation testing, predictive and presymptomatic testing, forensic testing, screening testing and research testing. • Compare different types of screening tests for prenatal screening, newborn screening or any other kind of population screening • Describe the application and use of various genetic tests. • Explain the guidelines for genetic tests. • Discuss the economic aspects of the genetic tests. **Testing methodologies/Technologies** • List various molecular defects that lead to various classes of genetic diseases. • Describe the cytogenetic methods of genetic testing like karyotyping and FISH. • Describe the molecular testing methods, guidelines or databases for their interpretation and reportability like PCR-RFLP, ARMS-PCR, Multiplex-PCR, SSCP, CSGE, DGGE, DHPLC, MALDI-TOF, DNA Sequencing, DNA extraction, MLPA, real-time PCR, gel electrophoresis, CGH array and sequencing etc. • Explain the process of identifying diseases and genetic tests for thalassemia, Fanconi anemia, Sickle Cell anemia, Fragile-X syndrome, Alzheimer's disease, Duchenne Muscular Dystrophy/Becker's Muscular Dystrophy, Huntington's disease.	• Create a sample plan for coordinating screening and diagnostic genetic testing. • Evaluate familial implications of genetic/genomic test results. • Analyze the probability of finding a genetic disorder using relevant knowledge and data based on pedigree analysis, inheritance patterns, genetic epidemiology, quantitative genetics principles, and mathematical calculations. • Demonstrate the process of conducting risk assessment by analyzing the results of mock screening, diagnostic and predictive genetic/genomic tests. • Demonstrate the process of explaining the results of genetic tests such as results of screening tests, chromosomal, biochemical, and molecular diagnosis to the client. • Demonstrate the process of determining the mode of inheritance and risk of occurrence and recurrence of the genetic condition/birth defect. • Research and prepare report on the SOPs of carrying out pre-implantation studies and newborn screening.

• Emphasize on genomic imprinting, e.g. BWS. • Discuss the different modes of inheritance, including multifactorial, and PRS scores when condition not due to single gene defect. Many common conditions are polygenic, e.g. diabetes. • Describe Allelic susceptibility test for multifactorial disorders like Neural Tube Defects (NTDs), cleft lip and palate, cardio- vascular disorders, male infertility. • Explain the biochemical testing methods. • Describe various genetic screening recommended for pregnant women, like cystic fibrosis external icon, sickle cell disease, etc that might be running in one's/ partner's family. • Discuss the importance of single cell multiplex-polymerase chain reactions for monogenic diseases and fluorescent in situ hybridization for chromosomal aberrations. • Discuss the procedure to carry out predictive genetic testing. **Counselling for Conducting Tests** • Discuss the elements to be used for preparing a contract of agreement to give the results. • Discuss the importance of providing non-biased information about all available options of screening/ diagnostic genetic diseases. • Discuss the importance of considering individual values and beliefs for evaluating the advantages and disadvantages of each testing option. • Discuss the importance of giving sufficient time and freedom to patients and family members to deliberate and seek further relevant input as necessary. • Discuss the importance of guiding the patient about the actionability of the genetic/ genomic test such as likelihood of all possible results such as positive, negative as well as uncertain or unexpected result. • Describe the importance of discussing factors regarding cost of testing and expectations regarding insurance coverage with the patient or family members in an appropriate manner. • Describe the importance of providing appropriate pretest information such as the nature of the sample required, appropriateness, limitations of the test and the scope of the outcome for decision-making in selecting tests or follow-up regarding results. • List of available alternative testing options and the risks, benefits and limitations of each possible results of testing (positive, negative, unclear and unexpected).	

• Discuss the implications and follow-up options if the results are positive • Discuss various possibilities of the test results such as a mutation in a different gene • Discuss the conditions under which Pre-Natal Diagnosis (PND) is appropriate, and the reasons justifying the same **Coordination for conducting tests** • Discuss the format of obtaining the pre-test consent • List the appropriate clinicians and healthcare professionals needs to be coordinated with for consultation time • Discuss the elements of report for informing the attending physician/ medical geneticist such as findings of the preliminary examination, pedigree analysis etc. • Describe the procedure of handing over the originals/ copies of the reports of the preliminary findings as and when appropriate to the clinician. • List common queries raised by the physician/ geneticist about the patient or collected information. • List factors of pre-test preparations useful to guide the patient/ family members about the next step. • Discuss the importance of obtaining timely reports through co-ordination with labs/organizations.	
Classroom Aids:	
Charts, Models, Video presentation, Flip Chart, White-Board/Smart Board, Marker, Duster.	
Tools, Equipment and Other Requirements	
Samples of genetic test results.	

Module 8: Chromosome studies, Cytogenetics, FISH and Microarray
Mapped to: HSS/N8716

Terminal Outcome:

- Discuss the concept of chromosome studies.
- Describe the concepts and principles of cytogenetics, FISH, and microarray in detail.
- Interpret results of various genomic testing and their implications on the patient.
- Carry out post-test counseling.

Duration: *21:00*	**Duration**: *30:00*
Theory – Key Learning Outcomes	**Practical – Key Learning Outcomes**
Concepts and Principles ● Refresh the concepts of organization of cell and cell cycle, cell division (Mitosis, Meiosis). ● Describe the chromosomal basis of inheritance, sex chromosome, X-chromosome inactivation. ● Discuss the concept and techniques of cell culture. ● Discuss the nomenclature of human chromosomes. ● Discuss the different methods of screening for mutations. ● Explain various chromosomal abnormalities and their implications. ● Explain the techniques of chromosome analysis. ● Discuss various chromosomal anomalies and disorders. ● Discuss the various chromosome studies available to determine whether a child has a genetic birth defect. ● Discuss the concept of karyotype and its advantages and disadvantages. ● Explain the events in which karyotype testing is recommended. ● Describe the concept, procedure, principle, merits of Fluorescence In Situ Hybridization (FISH). ● Discuss in brief the Chromosomal Microarray Analysis (CMA), its types, process, significance, and application. **Interpretation** ● Discuss the concepts related to interpretation of results like normal finding(s), physiological finding, normal variation, non-specific finding(s) without clinical relevance, incidental finding(s) with possible clinical relevance, finding(s) of uncertain significance, pathognomonic (disease specific, pathological) finding(s). ● Discuss the ways to interpret results of various genomic testing as appropriate	● Create visual representations of process of mitosis and meiosis. ● Demonstrate the use of software to analyze karyotypes and FISH. ● Evaluate sample reports of FISH and microarray. ● Demonstrate correlating inference of the test results with the sample case history. ● Perform role play on the different case scenarios to evaluate the urgency of scheduling further counseling sessions, further testing and need of referral of the patient to a medical geneticist. ● Prepare a sample format of comprehensive post-test counselling report including written summary of the test result, discussions done during the post counselling session and definitive health recommendations for the patient and family members. ● Prepare a sample follow-up plan including patient visits and diagnostic tests.

including chromosomal microarray, whole- exome sequencing, Next Generation Sequencing (NGS) based panel testing (like Illumina, Pacific Biosciences, and Oxford Nanopore), cytogenetic reports (karyotypes, FISH, spectral karyotypes), and newborn screening results. ● Discuss the methods of interpretation of estimate theoretical risks and empirical risks for the disorders. ● Describe the process of determining the pathogenicity of VUSs using linkage analysis, in silico and functional assays. ● Discuss the process of distinguishing which Next Generation Sequencing (NGS) obtained data is important and should be considered in the analysis, and which data is not significant. ● List the uses of genetic databases in determining variant classification depending on the mutations obtained. ● Discuss the process of forming a network of clinical, diagnostic and research specialists for support to diagnose and manage cases. **Post-test counselling** ● Discuss the different processes through which the patient and family members could be educated about the results of investigations. ● Discuss the importance of communicating genetic test results timely while maintaining utmost confidentiality. ● List the possible multidisciplinary clinical examination, electrophysiological/ radiological/ genetic or any other tests which may be required for further diagnosis. ● Discuss the different case scenarios to evaluate urgency and accordingly scheduling communication about further counseling sessions and further testing that may be needed. ● Discuss different ways of assessing the emotional status of the patient and family members after disclosure of the test results and providing psychosocial support accordingly. ● Discuss the different case scenarios to evaluate the need of referral of the patient immediately to a medical geneticist to discuss the implications of the findings in detail. ● Discuss the format of comprehensive post-test counselling report including written summary of the test result, discussions done during the post	

counselling session and definitive health recommendations for the patient and family members. ● Describe follow-up management planning. ● Describe the process of organizing and scheduling clinical activities, including patient visits, diagnostic tests, and follow-up. ● Discuss importance of obtaining a consent signature on the final post- test report after completion of the case study.	
Classroom Aids:	
Charts, Models, Video presentation, Flip Chart, White-Board/Smart Board, Marker, Duster	
Tools, Equipment and Other Requirements	
Various cytogenetic software, Instructional videos on procedure of Amniocentesis, FISH etc.	

Module 9: Documentation and record keeping in genetics
Mapped to: HSS/N8716

Terminal Outcome:

- Apply basic computer knowledge in performing various activities.
- Demonstrate technical skills of creating, updating and retrieval of the database.
- Carry out proper documentation of genetic counselling sessions, genetic tests and other records.

Duration: *06:00*	**Duration**: *30:00*
Theory – Key Learning Outcomes	**Practical – Key Learning Outcomes**
• Define the role and responsibilities of the genetic counselor in reporting and documentation. • List different standard documents to be procured from the patient. • Explain the purpose of obtaining written consent of authorized officer before sharing any patient related information to others. • Describe the importance of filing copies of consent forms for assessing medical records, DNA testing or sample storage and copies of correspondence to patient/first and extended families and health professionals. • Describe the importance of documenting results of investigations including the records that the reports have been seen by the appropriate health professional. • Describe the importance of maintaining a record of the copies of complete birth records, birth defect register form if applicable. • Describe the process of maintaining appropriate health records, preferably electronic, in a complete and comprehensive file for each family. • Describe the process of accessing central clinical genetics unit for the records of patients observed in outreach areas. • Describe the process of storing patient the files of patients with genetics consultation securely in a separate place at the concerned hospitals/ health records and how can it be accessed. • Describe the importance of maintaining the confidentiality of records. • Emphasize the importance of paperless documentation and record keeping as per the SOPs.	• Prepare a sample database of patients, incoming calls, and consultation records in genetics department. • Demonstrate application of standard norms and legislation for completing and documenting clinical and procedure related records. • Demonstrate maintaining of documents of genetic counselling session in a format consistent with the standard practice of the organization. • Demonstrate the process of providing written documentation of medical, genetic, and counselling information for families and other health professionals. • Demonstrate the process of recording sample patient information in HIS. • Demonstrate data entry, taking backups, saving, and retrieving the files, maintaining, and changing network connectivity process. • Prepare reports/documents using word processing software and spreadsheets. • Demonstrate the use of web browsers to surf on the Internet, send emails.
Classroom Aids:	
Charts, Models, Video presentation, Flip Chart, White-Board/Smart Board, Marker, Duster	
Tools, Equipment and Other Requirements	
Sample formats of reports and hospital documents, sample HIS software	

Module 10: Adult genetic counseling

Mapped to: HSS/N8717

Terminal Outcomes:

- Describe the concept of adult genetic counselling.
- Demonstrate the method of providing education related to genetic testing related to adult genetic disorders.

Duration: *26:00*	**Duration**: *15:00*
Theory – Key Learning Outcomes	**Practical – Key Learning Outcomes**
• Explain the concept of adult genetic counselling and its significance. • List various areas that come under adult genetic counseling such as cardiovascular genetics etc. • Discuss the significance of symptoms and family history in adult genetic counselling. • Describe familial hypercholesterolemia, muscular dystrophy and other muscle diseases. • Discuss inherited movement disorders such as Huntington's disease. • Describe inherited blood disorders such as sickle cell disease. • Explain various cardiovascular disorders such as Marfan syndrome, Loeys Dietz syndrome, vascular EDS, bicuspid aortic valve, thoracic aortic aneurysms etc. • Describe various endocrine disorders such as, hypogonadotropic hypogonadism • Describe various endocrine disorders such as retinal dystrophy, hereditary glaucoma. • Discuss genetic ENT disorders such as hereditary hearing loss- non-syndromic and syndromic. • Discuss the gastro- intestinal disorders like chronic pancreatitis • Describe various immunologic disorders such as hereditary Mediterranean fever, familial auto-inflammatory disorders etc. • Explain the pulmonary and renal diseases like idiopathic pulmonary fibrosis, Cystic diseases of kidney, Alport syndrome, disorder with or without dysmorphic features etc. • Discuss the management of patients with a known genetic condition as they transition to adulthood. • Discuss the significance of family history of genetic disorder or syndrome.	• Demonstrate the process of identifying signs and symptoms of various adult related genetic disorders. • Review sample case histories for calculating the risk of late-onset inherited diseases. • Demonstrate the method of providing counselling for clients with positive individual/ familial history.

• Describe the role of a genetic counselor if there is a suspicion for multisystem genetic disease.	
Classroom Aids:	
Charts, Models, Video presentation, Flip Chart, White-Board/Smart Board, Marker, Duster	
Tools, Equipment and Other Requirements	
Sample case studies, Instructional videos	

Module 11: Developmental, reproductive and infertility genetics

Mapped to: HSS/N8717

Terminal Outcomes:

- Describe the concepts of embryology, dysmorphology and their association with reproductive genetics.
- Demonstrate the method of providing education on genetic counselling in infertility, developmental and reproductive genetics.

Duration: *26:00*	**Duration**: *15:00*
Theory – Key Learning Outcomes	**Practical – Key Learning Outcomes**
• Explain the human reproductive system, reproductive organs, and gonads. • Differentiate between normal and abnormal physical and psychological development. • Outline the human development and etiology of developmental disorders such as DiGeorge syndrome, neural tube defect, cleft lip and palate, microcephaly etc. • Describe the etiology for abnormal embryological development. • Explain the etiology and pathogenesis in dysmorphology. • Explain the study of dysmorphology, and the embryological timing for abnormal development, including congenital malformations. • Explain the distinction between malformations, deformations, disruptions and dysplasia, syndromes, associations, and sequences. • Discuss the concept of teratogen influence. • Explain birth defect mechanism, common birth defects and their evaluation process. • Describe the concept of sex determination and hormonal basis of sexual differentiation. • Describe various reproductive disorders such as male/ female infertility, endometriosis, recurrent early pregnancy loss, polycystic ovarian disorder. • List conditions that requires referral to an ART/infertility genetic counselor such as Males with severe oligospermia or non- obstructive azoospermia. • Discuss the Genetic risk assessment in case of infertility. • Define Assisted Reproductive technologies (ART).	• Create visual representations of stages of human embryo development. • Review at least three generations of family history. • Analyse sample case studies of congenital malformations. • Evaluate sample cases of male and female infertility. • Prepare a sample plan to approach for identification and diagnosis of sample developmental disorders. • Demonstrate the process of explaining the diagnosis, etiology, natural history, monitoring and management of a genetic disorder. • Demonstrate the process of providing counseling for reproductive options including prenatal diagnosis and anticipatory guidance. • Demonstrate assisting a client in understanding the complexities of genetic testing, including limitations and benefits, and their impact. • Demonstrate the process of carrying out a pre-natal, pre-conception, post-conception genetic counselling session. • Demonstrate the process of providing information of next steps in the event of positive diagnosis.

• Describe various ethical and legal issues related to reproductive studies in Indian context such as Pre-Conception and Pre-Natal Diagnostic Techniques (PCPNDT) Act, 1994.	

Classroom Aids:
Charts, Models, Video presentation, Flip Chart, White-Board/Smart Board, Marker, Duster
Tools, Equipment and Other Requirements
Sample case studies, Instructional videos

Module 12: Pediatric counseling
Mapped to: HSS/N8717

Terminal Outcomes:

- Describe various syndromes and disorders in children.
- Demonstrate the method of providing counselling about genetic testing and further management in pediatric genetic disorders.

Duration: *26:00*	**Duration**: *15:00*
Theory – Key Learning Outcomes	**Practical – Key Learning Outcomes**
• Discuss various genetic conditions in children such as autism spectrum disorders (ASDs), developmental delays, learning disorders and intellectual disabilities and etiology. • Describe pediatric genetic disorders such as neurological, neuromuscular, connective tissue, vision or hearing disorders and Bone dysplasia etc. and its etiology • List various birth defects, such as spina bifida, cleft palate, brain malformations or heart defects, abnormal stature, or growth etc. and its etiology • Describe common genetic syndromes in children such as hematological, neurological, skeletal, cardiac, respiratory, endocrine, gastrointestinal, renal, eye, ear and skin disorders and inborn errors of metabolism and its etiology. • Discuss various national and international guidelines or screening programs followed in management of different genetic conditions such as RBSK guidelines for screening for 4Ds, National Rare Disorder Policy 2021 and Newborn screening programs of India, etc. • Discuss the role of genetic counselors in transition of patients from pediatric to adult care. • Discuss the risk of having an inherited disease that affects one's health in adulthood such as mitochondrial disorders, Fabry disease and Marfan syndrome. Discuss about treatable genetic disorders or where specialized diets, transplants or enzyme replacement therapy is available	• Prepare charts of inborn errors of metabolism. • Examine the possibility of other family members having a child with an inherited disease. • Evaluate the risk of having another child with a genetic disorder in sample case studies. • Demonstrate the process of carrying out genetic counselling sessions for positive diagnosis in sample scenarios. • Demonstrate the process of translating complex genetic information into understandable terms.
Classroom Aids:	
Charts, Models, Video presentation, Flip Chart, White-Board/Smart Board, Marker, Duster	
Tools, Equipment and Other Requirements	
Sample case studies, Instructional videos	

Module 13: Cancer genetic counseling
Mapped to: HSS/N8717

Terminal Outcome:

- Develop an understanding of cancer genetic counselling.
- Demonstrate the correct manner of providing counselling related to cancer diagnosis and prognosis.

Duration: *26:00*	**Duration**: *15:00*
Theory – Key Learning Outcomes	**Practical – Key Learning Outcomes**
• Describe the cancer biology. • Explain the concept of familial cancer syndromes. • Discuss the molecular basis of cancer. • Describe the method of cancer risk assessment. • Determine whether history is suggestive of an inherited cancer syndrome. • List various genetic testing options for cancer. • Explain the chromosomal abnormalities in cancer. • Describe various cancers associated with genetics such as Lynch syndrome (hereditary non-polyposis colorectal and other cancers), Hereditary breast and ovarian cancer (HBOC) syndrome, Li-Fraumeni syndrome etc. • List conditions that require referral to a genetic counselor such as cancer diagnosed at an unusually young age (e.g. breast or colon cancer before age 50). • Explain the process of assessing the risk of developing cancer-based on the collected information. • Describe the genetic basis of inherited cancer and cancer syndromes, • Outline the development and treatment of cancer. • Discuss key concepts of National Comprehensive Cancer Network guidelines for hereditary cancer • Enlist surveillance plan based on germline cancer predisposition variant. • Discuss elective surgical procedures to reduce the risk of cancer • Enlighten about precision Oncology • Discuss the role and methods of reproductive planning • Discuss polygenic risk scores for cancer susceptibility • Discuss the testing tumors for screening e.g. for Lynch syndrome.	• Create charts on common genetic cancers and their clinical presentation. • Collect a detailed cancer-focused personal and family medical history. • Demonstrate assessment of cancer risk inheritance in sample case studies. • Demonstrate supporting clients and first family members on pre-symptomatic testing in high risk cases. • Demonstrate carrying out counselling session on genetic tests related to cancer diagnosis. • Review sample medical management options with or without genetic testing. • Demonstrate the process of breaking bad news in the event of cancer diagnosis with guarded prognosis. • Demonstrate the process of providing psychosocial support to patients and families and facilitating communication between patients and their families regarding risk information and recommendations. • Create follow up plans in sample cancer case studies.

• Define liquid biopsy. • Discuss how test results affect treatment, e.g. PARP inhibitors for BRCA1 mutation carriers. • Discuss penetrance of different cancer susceptibility genes. • Understand about Next-Generation Sequencing (NGS), its application and how it will impact the future of Genetic Counselor.	
Classroom Aids:	
Charts, Models, Video presentation, Flip Chart, White-Board/Smart Board, Marker, Duster	
Tools, Equipment and Other Requirements	
Sample case studies, Instructional videos	

Module 14: Neurogenetics and Psychiatric Genetics
Mapped to: HSS/N8717

Terminal Outcome:

- Develop an understanding of neurogenetics and psychiatric genetics.
- Demonstrate the role of a genetic counselor in neurogenetics and Psychiatric genetics.

Duration: *26:00*	**Duration**: *15:00*
Theory – Key Learning Outcomes	**Practical – Key Learning Outcomes**
• Explain the concept of psychiatric genetics, neurogenetics and neurodegeneration. • Correlate neurogenetics, genetics, neuroscience, psychology, and psychiatry. • Describe different Muscular dystrophies/myopathies like dystrophin-associated, congenital muscular dystrophies, facioscapulohumeral muscular dystrophy, limb girdle weakness, myotonia, oculopharyngeal muscular dystrophy. • Explain various motor neuron diseases such as peripheral neuropathy, ALS, spinal muscular atrophy. • Describe the Hereditary movement disorders, e.g., ataxia, dystonia, spastic paraplegia, Huntington's chorea, Parkinsonism. • Explain various neuropsychiatric disorders such as Attention Deficit Hyperactivity Disorder (ADHD), anxiety disorders, autistic spectrum disorders, bipolar disorder, major depressive disorder, and schizophrenia. • List various disorders where a person has unexplained elevated CK levels, ptosis, facial weakness, muscle atrophy etc. • Explain the benefit of neurogenetics counseling. • Understand and identify various monogenic and polygenic neurodegenerative conditions.	• Collect complete patient and family history. • Demonstrate the process of identifying the family members at risk for an inherited neurogenetic condition. • Demonstrate the process of identifying symptoms of neurogenetic diseases such as ADHD, Parkinson's disease etc. • Demonstrate the process of providing information about genetic testing and family planning options to individuals. • Demonstrate the method of carrying out counselling sessions in psychiatric disorders. • Create mock follow up and referral plans for patients with neurogenetic or psychiatric diseases.
Classroom Aids:	
Charts, Models, Video presentation, Flip Chart, White-Board/Smart Board, Marker, Duster	
Tools, Equipment and Other Requirements	
Sample case studies, Instructional videos	

Module 15: Applications of genetic counseling in different medical specialties
Mapped to: HSS/N8717

Terminal Outcome:

- Identify genetic conditions in different medical specialties.

Duration: *10:00*	**Duration**: *15:00*
Theory – Key Learning Outcomes	**Practical – Key Learning Outcomes**
• Explain the role of genetic counselors in like ophthalmology, cardiology, endocrinology, and hematology. • List common referral reasons in these specialties to genetic counselors. • Discuss identifying patients with known or suspected heritable diseases and promoting cascade family screening or testing of at-risk relatives.	• Collect complete patient and family history. • Demonstrate the process of identifying the family members at risk for an inherited genetic condition. • Demonstrate the process of providing information about genetic testing and family planning options to individuals.
Classroom Aids:	
Charts, Models, Video presentation, Flip Chart, White-Board/Smart Board, Marker, Duster	
Tools, Equipment and Other Requirements	
Sample case studies, Instructional videos	

Module 16: Process of genetic counseling
Mapped to: HSS/N8717

Terminal Outcome:

- Carry out a genetic counselling session.
- Support the client in informed decision making.

Duration: *26:00*	**Duration**: *15:00*
Theory – Key Learning Outcomes	**Practical – Key Learning Outcomes**
• Identify situations in which genetic counseling is warranted. • Discuss the principles of genetic counseling. • Explain the process for pre-consultation contact. • List basic agenda points used during consultation. • Explain the process of preparation for genetic consultation. • Explain the diagnosis, etiology, natural history, monitoring and management of a genetic disorder. • Discuss the methods of facilitating decision-making. • Discuss the process of promoting informed choices in view of risk assessment, family goals, ethical and religious values. • Describe the risk of recurrence of a genetic disorder. • Discuss options regarding disease management, the risks and benefits of further testing and other options. • List psychosocial tools required to cope with potential outcomes. • Differentiate methodologies of Individuals vs couple vs family counselling as per different scenario. • Discuss the difficulty of assessing the penetrance of a mutation in a susceptibility gene when detected in the general population v.s. in a family with the relevant condition/susceptibility.	• Use appropriate counselling techniques like listening, observing, reflecting etc. to address client expectations, perceptions, knowledge, and concerns. • Demonstrate the process of assessing prior and current psychological state of clients in sample case scenarios. • Demonstrate the process of providing information about natural history of the condition, inheritance pattern, testing, management, prevention, support resources. • Demonstrate the process of obtaining informed consent. • Demonstrate carrying out a mock counseling session in different case scenarios such as cases of metabolic, cardiovascular disorders etc. • Conduct role plays of Individuals, couple and family counselling as per different scenario.
Classroom Aids:	
Charts, Models, Video presentation, Flip Chart, White-Board/Smart Board, Marker, Duster	
Tools, Equipment and Other Requirements	
Sample case studies, Instructional videos.	

Module 17: Interpersonal psychosocial and soft skills in genetic counselling
Mapped to: HSS/N8717

Terminal Outcomes:

- Communicate effectively with co-workers.
- Organize and prioritize work to complete assignments on time.
- Adhere to organizational code of conduct while handling conflicts.

Duration: *10:00*	**Duration**: *15:00*
Theory – Key Learning Outcomes	**Practical – Key Learning Outcomes**
• Discuss the significance and techniques of counselling in genetics. • Describe the basics of psychosocial, interpersonal, and counselling skills such as perception, building a rapport and giving news. • Explain the range of patient emotions, individual and family experiences, beliefs, behaviors, values, coping mechanisms, and adaptive capabilities. • Discuss the importance of effective communication with patients, relatives, and colleagues. • Discuss confidentiality and privacy practices related to patient's information. • Discuss the importance of following rules and policies of organization for maintaining code of conduct and scope of work. • Compare strengths and limitations of different counselling models. • Discuss various client emotions, individual and family experiences, beliefs, behaviors, values, coping mechanisms, and adaptive capabilities. • Explain the importance of forming interpersonal/therapeutic relations. • Illustrate client expectations, perceptions, knowledge, and concerns regarding the genetic counseling encounter and the reason for referral or contact.	• Demonstrate the usage of technical terms to ensure effective communication. • Apply active listening and interviewing skills to identify, assess, and empathically respond to concerns. • Demonstrate problem solving and decision-making skills in different situations. • Demonstrate skills of team- work and work prioritization in different team activities. • Demonstrate basic telephone and email etiquettes. • Prepare reports using the information gathered from observation, experience, reasoning, or communication. • Evaluate client emotions, individual and family experiences, beliefs, behaviors, values, coping mechanisms, and adaptive capabilities. • Demonstrate the process of assessing client emotional and behavioral cues, expressed both verbally and non-verbally.
Classroom Aids:	
Charts, Models, Video presentation, Flip Chart, White-Board/Smart Board, Marker, Duster.	
Tools, Equipment and Other Requirements	
Instructional videos.	

Module 18: Ethical, legal and philosophical principles in genetic counselling
Mapped to: HSS/N8717

Terminal Outcomes:

- Describe the relevant legislation, standards, policies, and procedures followed in healthcare organization.
- Identify the key ethical issues related to genetics.

Duration: *10:00*	**Duration**: *15:00*
Theory – Key Learning Outcomes	**Practical – Key Learning Outcomes**
• Explain the ethical, legal and philosophical principles and values of the genetic counseling profession and the policies of one's institution or organization. • Outline code of medical ethics. • Explain the method of identifying and addressing ethical and moral dilemmas in genetic counseling practice. • Discuss the importance and requirements of consent and maintaining confidentiality. • Identify factors that promote client autonomy. • Ascertain and comply with current professional credentialing requirements, at the institutional, state, regional and national level. • List the situations that may result in a real or perceived conflict of interest. • Explain the indications and grounds of the Medical Termination of Pregnancy Act, 1971 • Discuss the requirements for MTP, complications of MTP. • Explain the criminal abortion. • Describe the regulation of genetic counseling centre. • Explain the regulation of pre -natal diagnosis, determination of Sex prohibited. • Discuss the precautions and procedure of recording, special circumstances, importance (section 32 & 157) of Indian Evidence Act). • Describe the Prenatal Diagnostic Techniques Act 1994.	• Demonstrate the process of addressing discrepancies between personal values and difficult candidate situations. • Demonstrate the process of taking consent. • Demonstrate the method of maintaining confidentiality of patient's information such as prudent disclosure of information.
Classroom Aids:	
Charts, Models, Video presentation, Flip Chart, White-Board/Smart Board, Marker, Duster.	
Tools, Equipment and Other Requirements	
Sample consent forms, copy of MTP Act.	

Module 19: Population genetics

Mapped to: HSS/N8718

Terminal Outcomes:

- Explain the concept of population genetics.
- Demonstrate the use of various linkage theories and equations.

Duration: *10:00*	**Duration**: *18:00*
Theory – Key Learning Outcomes	**Practical – Key Learning Outcomes**
• Discuss the concepts of demographic cycle. • Explain the latest Demographic trend in India. • Explain the latest National population policy. • Discuss the concept of family planning and its importance. • Explain the concept and advantages of population genetics. • Explain the patterns of human genetic variation among populations and among individuals. • Discuss the basics of genetic epidemiology including interpretation of large-scale, population based genetic studies. • Explain the probability theory. • Discuss how theories of human genetics can be applied to populations. • Discuss segregation and linkage analysis. • Explain the Bayesian Theorem. • Discuss the influence of evolutionary factors on variation. • Discuss in brief the four major factors of evolution – mutation, natural selection, genetic drift and gene flow. • Discuss how much do human populations differ. • Describe the principles and concept of segregation analysis, Hardy Weinberg equilibrium, Linkage disequilibrium and LoD Score methods.	• Demonstrate the usage of segregation analysis for statistically detecting the Mendelian ratio in sample human sibships. • Demonstrate the application of Hardy Weinberg equilibrium equation for calculating the genetic variation of a sample population at equilibrium. • Demonstrate the use of Linkage disequilibrium and LoD Score methods for estimation and analysis of genetic linkage in sample case studies.
Classroom Aids:	
Charts, Models, Video presentation, Flip Chart, White-Board/Smart Board, Marker, Duster.	
Tools, Equipment and Other Requirements	
Sample case studies of Mendelian disorders.	

Module 20: Culture and ethnicity

Mapped to: HSS/N8718

Terminal Outcomes:

- Discuss the ethical, cultural, and societal responsibilities of genetic counselors.

Duration: *06:00*	**Duration**: *15:00*
Theory – Key Learning Outcomes	**Practical – Key Learning Outcomes**
• Distinguish between the concept of ethnicity and race. • Discuss the health disparities. • Describe race and genetic variation. • Describe how aspects of culture including language, religion, ethnicity, life- style, socioeconomic status, disability, sexuality, age, and gender affect the genetic counseling encounter. • Explain how the genetic counselor's personal, cultural characteristics and biases may impact patient counselling. • Describe the process of assessing and responding to client cultural beliefs relevant to genetic counseling.	• Apply knowledge of cultural and religious knowledge to plan out the session for genetic counseling session. • Prepare a sample questionnaire considering the cultural aspects. • Prepare a sample response sheet on queries pertaining to religious beliefs. • Use multicultural genetic counseling resources to plan and tailor genetic counseling agendas for assessment and counseling.
Classroom Aids:	
Charts, Models, Video presentation, Flip Chart, White-Board/Smart Board, Marker, Duster	
Tools, Equipment and Other Requirements	
Sample questionnaires	

Module 21: Community awareness in genetic counselling

Mapped to: HSS/N8718

Terminal Outcomes:

- Create awareness on genetic disorders and their management at community level.
- Demonstrate the process of carrying out our community screening.

Duration: *10:00*	**Duration**: *30:00*
Theory – Key Learning Outcomes	**Practical – Key Learning Outcomes**
• Explain the duties of a genetic counselor to the patients, profession at large and to the public. • Identify factors that affect the learning process such as socioeconomic factors, religious and cultural beliefs, language, and educational background, etc. • Describe the process of communicating the relevant information to help clients understand and adapt to conditions. • Discuss client concerns that may arise about privacy related protections. • List common values, attitudes, perceptions of clients, families, and the communities related to genetic diseases. • Discuss various strategies to increase/promote population, newborn, prenatal screening. • Discuss the methods to recognize and address potential tension between the values of clients, families, communities and the genetic counseling profession. • Identify various genetic professional organizations in the community. • List the signs of consanguinity and inbreeding in the community. • Describe strategies that increase/promote access to genetic counseling services.	• Draft a sample survey plan/ questionnaire to gauge the knowledge of the community. • Apply risk communication principles to maximize client understanding. • Create IEC material to enhance the learning such as handouts, visual aids, and other educational technologies. • Demonstrate the process of organizing and schedule community activities, such as screening clinics/camps and school visits. • Demonstrate the methods communicating relevant genetic and genomic information to help clients understand and adapt conditions or the risk of conditions and to engage in informed decision-making. • Demonstrate the use of Information, Education and Communication (IEC) material such as handouts, visual aids, and other educational technologies for community awareness on genetic disorders and management.
Classroom Aids:	
Charts, Models, Video presentation, Flip Chart, White-Board/Smart Board, Marker, Duster	
Tools, Equipment and Other Requirements	
IEC material on community awareness such as charts, Flip charts, electronic presentation, pamphlets etc.	

Module 22: Genetics awareness at hospital level

Mapped to: HSS/N8718

Terminal Outcomes:

- Create awareness related to genetics amongst the hospital staff related/ unrelated to genetic diseases and their management.

Duration: *10:00*	**Duration:** *28:00*
Theory – Key Learning Outcomes	**Practical – Key Learning Outcomes**
• Determine need of education related to genetics in the hospital. • Describe the process of creating, implementing, and modifying specific hospital action plans related to genetics. • List the steps of carrying out Knowledge, Attitude and Practices (KAP) analysis of the hospital staff related to genetics. • Describe the process of planning and conducting Continuing Medical Education (CME)/ Continuing Nursing Education (CNE) sessions. • Discuss opportunities for participation and leadership. • Outline the importance of maintaining and improving one's own professional education and competence. • Describe the concept of tele genetics and its importance in aiding the practice of genetic counselling. • Explain the provisions and limitations of tele genetics.	• Create a sample awareness plan related to genetic disorder and management. • Create a sample blueprint of the agenda and topics of training session for CME and CNE. • Draft a roadmap of rolling out training session according to varied audiences. • Create reports on feedback and results of session plans. • Demonstrate the process of impact analysis in awareness sessions in the organizations. • Demonstrate the process of collaborating with the marketing team for creation of IEC material. • Demonstrate the process of facilitating an online genetic counseling session. • Demonstrate providing mentorship and guidance for the professional development of other genetic counsellors, students, and colleagues.
Classroom Aids:	
Charts, Models, Video presentation, Flip Chart, White-Board/Smart Board, Marker, Duster.	
Tools, Equipment and Other Requirements	
SOPs on hospital awareness programs, sample KAP analysis questionnaire, copy of PNDT Act.	

Module 23: Infection control policies and procedures
Mapped to: HSS/N9620

Terminal Outcomes:

- Develop techniques of self-hygiene.
- Apply infection control policies and procedures during daily activities.

Duration: *05:00*	**Duration**: *07:00*
Theory – Key Learning Outcomes	**Practical – Key Learning Outcomes**
Importance of Infection control ● Explain the concept of healthy living. ● Describe the importance of infection control and prevention. ● List strategies for preventing transmission of pathogenic organisms. ● Describe the nosocomial infections. ● Explain the importance of incident reporting. **Immunization and vaccination** ● Explain the concept of immunization. ● Explain various vaccinations against common infectious diseases. **Hand hygiene and Personal protective equipment** ● Describe the hand-hygiene guidelines and procedures used in healthcare settings. ● Explain the importance of using Personal Protective Equipment (PPE). ● List the types of PPE. ● Describe the process of wearing and removing each of the PPE.	● Demonstrate the steps of spill management. ● Demonstrate the procedures of hand hygiene. ● Demonstrate donning, doffing and discarding of PPE.
Classroom Aids:	
Charts, Models, Video presentation, Flip Chart, White-Board/Smart Board, Marker, Duster	
Tools, Equipment and Other Requirements	
Hypochlorite solution, chlorhexidine, alcohol swab, Apron, lab coat, gloves, mask, cap, shoes, safety goggles and spectacles, towels, cotton, isopropyl alcohol Disposable cartridge and syringes, Spill Kit.	

Module 24: Bio-medical waste management

Mapped to: HSS/N9620

Terminal Outcomes:

- Dispose of different types of biomedical waste in appropriate colour coded bins/containers.
- Apply local guidelines of biomedical waste disposal system during daily activities.

Duration: *05:00*	**Duration**: *08:00*
Theory – Key Learning Outcomes	**Practical – Key Learning Outcomes**
Categorize of different types of waste ● Categorize the different types of biomedical waste. ● Explain the importance and mechanism of proper and safe disposal, transportation and treatment of bio-medical waste. **Importance of color-coded bins** ● Identify the various types of colour coded bins/containers used for disposal of biomedical waste. ● Explain the importance of following local guidelines of biomedical waste disposal.	**Categorize of different types of waste** ● Segregate the biomedical waste applying the local guidelines. **Importance of color-coded bins** ● Create a chart depicting different types of biomedical waste and various types of colour coded bins/containers used for disposal of biomedical waste. ● Prepare a report on the observations from field assignment about the structure of transportation and treatment of bio-medical waste.
Classroom Aids:	
Charts, Models, Video presentation, Flip Chart, White-Board/Smart Board, Marker, Duster.	
Tools, Equipment and Other Requirements	
Different coded color bins, chart for color coding of bins, visit to biomedical waste treatment plant for field assignment.	

Module 25: Personal Hygiene

Mapped to: HSS/N9620

Terminal Outcomes:

- Develop techniques of self-hygiene
- Apply infection control policies and procedures during daily activities

Duration: *05:00*	**Duration**: *05:00*
Theory – Key Learning Outcomes	**Practical – Key Learning Outcomes**
• Develop understanding of the concept of Healthy Living. • Develop understanding & procedures of Hand Hygiene. • Develop techniques of self-grooming and maintenance. **Immunization and vaccination** • Explain the concept of immunization. • Explain various vaccinations against common infectious diseases. **Hand hygiene and Personal protective equipment** • Describe the hand-hygiene guidelines and procedures used in healthcare settings. • Explain the importance of using Personal Protective Equipment (PPE). • List the types of PPE. • Describe the process of wearing and removing each of the PPE.	**Hand hygiene and Personal protective equipment** • Demonstrate the procedures of hand hygiene. • Demonstrate donning, doffing and discarding of PPE .
Classroom Aids:	
Charts, Models, Video presentation, Flip Chart, Whiteboard/Smart Board, Marker, Duster.	
Tools, Equipment and Other Requirements	
E-modules depicting sanitization, infection control and waste disposal practices.	

Module 26: Employability Skills (90 hours)

Mapped to DGT/VSQ/N0103: Employability Skills (90 Hours)

Mandatory Duration: *90:00*			
Location: On-Site			
S.No.	**Module Name**	**Key Learning Outcomes**	**Duration (hours)**
1.	Introduction to Employability Skills	• Outline the importance of Employability Skills for the current job market and future of work. • List different learning and employability related GOI and private portals and their usage. • Research and prepare a note on different industries, trends, required skills and the available opportunities.	3
2.	Constitutional values - Citizenship	• Explain the constitutional values, including civic rights and duties, citizenship, responsibility towards society and personal values and ethics such as honesty, integrity, caring and respecting others that are required to become a responsible citizen. • Demonstrate how to practice different environmentally sustainable practices.	1.5
3.	Becoming a Professional in the 21st Century	• Discuss relevant 21st century skills required for employment. • Highlight the importance of practicing 21st century skills like Self-Awareness, Behavior Skills, time management, critical and adaptive thinking, problem-solving, creative thinking, social and cultural awareness, emotional awareness, learning to learn etc. in personal or professional life. • Create a pathway for adopting a continuous learning mindset for personal and professional development.	5
4.	Basic English Skills	• Show how to use basic English sentences for everyday conversation in different contexts, in person and over the telephone. • Read and understand text written in basic English. • Write a short note/paragraph / letter/e -mail using correct basic English.	10
5.	Career Development & Goal Setting	• Create a career development plan. • Identify well-defined short- and long-term goals.	4
6.	Communication Skills	• Demonstrate how to communicate effectively using verbal and nonverbal communication etiquette. • Write a brief note/paragraph on a familiar topic. • Explain the importance of communication etiquette including active listening for effective communication. • Role play a situation on how to work collaboratively with others in a team.	10

7.	Diversity & Inclusion	• Demonstrate how to behave, communicate, and conduct appropriately with all genders and PwD. • Discuss the significance of escalating sexual harassment issues as per POSH act.	2.5
8.	Financial and Legal Literacy	• Discuss various financial institutions, products, and services.	10
		• Demonstrate how to conduct offline and online financial transactions, safely and securely and check passbook/statement. • Explain the common components of salary such as Basic, PF, Allowances (HRA, TA, DA, etc.), tax deductions. • Calculate income and expenditure for budgeting • Discuss the legal rights, laws, and aids.	
9.	Essential Digital Skills	• Describe the role of digital technology in day-to-day life and the workplace. • Demonstrate how to operate digital devices and use the associated applications and features, safely and securely. • Demonstrate how to connect devices securely to internet using different means. • Follow the dos and don'ts of cyber security to protect against cyber-crimes. • Discuss the significance of displaying responsible online behavior while using various social media platforms. • Create an e-mail id and follow e- mail etiquette to exchange e -mails. • Show how to create documents, spreadsheets and presentations using appropriate applications. • Utilize virtual collaboration tools to work effectively.	20
10.	Entrepreneurship	• Explain the types of entrepreneurship and enterprises. • Discuss how to identify opportunities for potential business, sources of funding and associated financial and legal risks with its mitigation plan. • Describe the 4Ps of Marketing-Product, Price, Place and Promotion and apply them as per requirement. • Create a sample business plan, for the selected business opportunity.	7
11	Customer Service	• Classify different types of customers. • Demonstrate how to identify customer needs and respond to them in a professional manner • Discuss various tools used to collect customer feedback. • Discuss the significance of maintaining hygiene and dressing appropriately.	9
12	Getting Ready for Apprenticeship & Jobs	• Draft a professional Curriculum Vitae (CV). • Use various offline and online job search sources to find and apply for jobs. • Discuss the significance of maintaining hygiene and dressing appropriately for an interview. • Role play a mock interview. • List the steps for searching and registering for apprenticeship opportunities	8

LIST OF TOOLS & EQUIPMENT FOR EMPLOYABILITY SKILLS		
S No.	**Name of the Equipment**	**Quantity**
1.	Computer (PC) with latest configurations – and Internet connection with standard operating system and standard word processor and worksheet software (Licensed) (all software should either be latest version or one/two version below)	As required
2.	UPS	As required
3.	Scanner cum Printer	As required
4.	Computer Tables	As required
5.	Computer Chairs	As required
6.	LCD Projector	As required
7.	White Board 1200mm x 900mm	As required
Note: Above Tools &Equipment not required, if Computer LAB is available in the institute.		

On-Job Training

Mandatory Duration: *<420:00>*	
Module Name: On-the-Job **Training Location: On Site**	
Terminal Outcomes ● Display basic knowledge of commonly occurring genetic disorders. ● Assess the clients' level of background knowledge, so that counselling and information may be focused appropriately. ● Obtain information from the patient/family both with respect to the medical situation that brought them to genetic counselling and with respect to their own primary concerns. ● Communicate information regarding genetic concepts, genetic diseases and the personal and medical consequences of genetic disease to individual clients (most of whom will have no scientific training), the public and other health professionals. ● Respond to those concerns with medical or genetic information, with psychological support, and where appropriate, with referral to social service agencies or other health professionals. ● Help the family understand, where appropriate, the normal psychological reactions to death of a child, loss of a pregnancy or coping with a family member with genetic disease and provide the requisite support. ● Explain the alternatives available to each family, both with respect to medical management, life expectancy and social services, and with respect to psychological adjustments. ● Convey information without infringing upon individual social, cultural or religious beliefs. ● Identify the concerns of the patient/family (or community group) with respect to a specific genetic disease or genetic disorders in general. ● Identify families and clients whose levels of stress or distress require a professional psychological referral. ● Identify the most appropriate referrals for patients and families, both for medical and non-medical support. ● Identify situations in which ethical/legal issues are likely to arise, and to counsel/inform accordingly. ● Convey information to colleagues and patients in a concise and accurate manner. ● Tailor, translate and communicate complex information in a simple, relevant way for a broad range of audiences. ● Transfer specialized knowledge to others (patients, other professionals, patients, etc. ● Prescribing and interpretation of different genetic tests, their applications and shortcomings ● Demonstrate strong interpersonal skills, emotional intelligence, and self-awareness. ● Promote teamwork, collaboration, and consensus building, ● Find solutions to problems risk assessment; results interpretation; family history assessment. ● Analyse counseling session to provide relevant information and follow-up. ● Identify information sources including medical literature and experts and extract relevant information for audience. ● Identify relevant benefits of genetic services for marketing purposes.	

Annexure

Trainer Requirements

Trainer Prerequisites						
Minimum Educational Qualification	**Specialization**	**Relevant Industry Experience**		**Training Experience**		**Remarks**
		Years	***Specialization***	***Years***	***Specialization***	
Graduate	Graduate (Nursing/ Allied Health Professionals)/ Dentistry/life sciences/clinical psychology/ Biotechnology or genetics)	6	Experience working in hospitals with Genetics units	5	Working in hospital Genetics Units	Preferably observed >200 cases in the Genetics Unit with a senior Genetic Counselor/Clinical Geneticist
Postgraduate	Postgraduate (Nursing/ Allied Health Professionals)/ Dentistry/life sciences/clinical psychology/ Biotechnology or genetics)	5	Experience working in hospitals with Genetics units	4	Working in hospital Genetics Units	Preferably observed >200 cases in the Genetics Unit with a senior Genetic Counselor/Clinical Geneticist
Medical Graduate	Medical Graduate (MBBS/ BHMS/ BAMS/ BUMS)	4	Experience working in hospitals with Genetics units	3	Working in hospital Genetics Units	Preferably observed >200 cases in the Genetics Unit with a senior Genetic Counselor/Clinical Geneticist

Trainer Certification

Domain Certification	Platform Certification
Certified for Job Role: “Genetic Counselor” mapped to QP: “HSS/Q8705 v3.0” with minimum score of 80%.	Recommended that the Trainer is certified for the Job Role: “Trainer (VET and Skills)”, mapped to the Qualification Pack: “MEP/Q2601, v2.0” with minimum score of 80%.

Assessor Requirements

Assessor Prerequisites						
Minimum Educational Qualification	**Specialization**	**Relevant Industry Experience**		**Training /Assessment Experience**		**Remarks**
		Years	***Specialization***	***Years***	***Specialization***	
Graduate	Graduate (Nursing/ Allied Health Professionals)/Dentistry/life sciences/clinical psychology/ Biotechnology or genetics)	7	Experience working in hospitals with Genetics units	5	Working in hospital Genetics Units	Preferably observed >200 cases in the Genetics Unit with a senior Genetic Counselor/Clinical Geneticist
Postgraduate	Postgraduate (Nursing/ Allied Health Professionals)/Dentistry/life sciences/clinical psychology/ Biotechnology or genetics)	6	Experience working in hospitals with Genetics units	4	Working in hospital Genetics Units	Preferably observed >200 cases in the Genetics Unit with a senior Genetic Counselor/Clinical Geneticist
Medical Graduate	Medical Graduate (MBBS/ BHMS/ BAMS/ BUMS)	5	Experience working in hospitals with Genetics units	3	Working in hospital Genetics Units	Preferably observed >200 cases in the Genetics Unit with a senior Genetic Counselor/Clinical Geneticist

Assessor Certification	
Domain Certification	**Platform Certification**
Certified for Job Role: “Genetic Counselor” mapped to QP: “HSS/Q8705 v3.0” with minimum score of 80%.	Recommended that the Assessor is certified for the Job Role: “Assessor (VET and Skills)”, mapped to the Qualification Pack: “MEP/Q2701, v2.0” with minimum score of 80%.

Assessment Strategy

The emphasis is on 'learning-by-doing' and practical demonstration of skills and knowledge based on the performance criteria. Accordingly, assessment criteria for each job role is set and made available in qualification pack.

The assessment papers for both theory and practical would be developed by Subject Matter Experts (SME) hired by Healthcare Sector Skill Council or with the HSSC accredited Assessment Agency as per the assessment criteria mentioned in the Qualification Pack. The assessments papers would also be checked for the various outcome based parameters such as quality, time taken, precision, tools & equipment requirement etc.

Each NOS in the Qualification Pack (QP) is assigned a relative weightage for assessment based on the criticality of the NOS. Therein each Element/Performance Criteria in the NOS is assigned marks on relative importance, criticality of function and training infrastructure.

The following tools would be used for final assessment:

1. Practical Assessment: This comprises of a creation of mock environment in the skill lab which is equipped with all equipment required for the qualification pack.

Candidate's soft skills, communication, aptitude, safety consciousness, quality consciousness etc. is ascertained by observation and marked in observation checklist. The outcome is measured against the specified dimensions and standards to gauge the level of their skill achievements.

2. Viva/Structured Interview: This tool is used to assess the conceptual understanding and the behavioral aspects with regard to the job role and the specific task at hand. It also includes questions on safety, quality, environment and equipment etc.

3. On-Job Training: OJT would be evaluated based on standard log book capturing departments worked on, key observations of learner, feedback and remarks of supervisor or mentor.

4. Written Test: Question paper consisting of 100 MCQs (Hard:40, Medium:30 and Easy: 30) with questions from each element of each NOS. The written assessment paper is comprised of following types of questions:

i. True / False Statements
ii. Multiple Choice Questions
iii. Matching Type Questions.
iv. Fill in the blanks
v. Scenario based Questions
vi. Identification Questions

QA Regarding Assessors:

Assessors are selected as per the "eligibility criteria" laid down by HSSC for assessing each job role. The assessors selected by Assessment Agencies are scrutinized and made to undergo training and introduction to HSSC Assessment Framework, competency based assessments, assessors guide etc. HSSC conducts "Training of Assessors" program from time to time for each job role and sensitize

assessors regarding assessment process and strategy which is outlined on following mandatory parameters:

1) Guidance regarding NSQF
2) Qualification Pack Structure
3) Guidance for the assessor to conduct theory, practical and viva assessments
4) Guidance for trainees to be given by assessor before the start of the assessments.
5) Guidance on assessments process, practical brief with steps of operations practical observation checklist and mark sheet
6) Viva guidance for uniformity and consistency across the batch.
7) Mock assessments
8) Sample question paper and practical demonstration

References

Glossary

Term	Description
Declarative Knowledge	Declarative knowledge refers to facts, concepts and principles that need to be known and/or understood in order to accomplish a task or to solve a problem.
Key Learning Outcome	Key learning outcome is the statement of what a learner needs to know, understand and be able to do in order to achieve the terminal outcomes. A set of key learning outcomes will make up the training outcomes. Training outcome is specified in terms of knowledge, understanding (theory) and skills (practical application).
OJT (M)	On-the-job training (Mandatory); trainees are mandated to complete specified hours of training on site
OJT (R)	On-the-job training (Recommended); trainees are recommended the specified hours of training on site
Procedural Knowledge	Procedural knowledge addresses how to do something, or how to perform a task. It is the ability to work, or produce a tangible work output by applying cognitive, affective or psychomotor skills.
Training Outcome	Training outcome is a statement of what a learner will know, understand and be able to do **upon the completion of the training**.
Terminal Outcome	Terminal outcome is a statement of what a learner will know, understand and be able to do **upon the completion of a module.** A set of terminal outcomes help to achieve the training outcome.

Acronyms and Abbreviations

Term	Description
QP	Qualification Pack
NSQF	National Skills Qualification Framework
NSQC	National Skills Qualification Committee
NOS	National Occupational Standards
HLA	Human Leukocyte Antigen
DNA	Deoxyribonucleic Acid
MLC	Medico Legal Case
FISH	Fluorescence In Situ Hybridization
CMA	Chromosomal Microarray Analysis
ART	Assisted Reproductive Technology
CVS	Chorionic Villus Sampling
CMV	Cytomegalovirus
HBOC	Hereditary Breast and Ovarian Cancer
ASD	Autism Spectrum Disorder
PPE	Personal Protective Equipment
USG	Ultrasonography
AC	Amniocentesis
FBS	Fetal blood sampling
MTP Act	Medical Termination of Pregnancy Act