# Model Curriculum

**QP Name: Genetic Counselor**

**QP Code: HSS/Q8705**

**QP Version: 1.0**

**NSQF Level: 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

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# Training Parameters

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|---|---|
| **Sector** | Healthcare |
| **Sub-Sector** | Social Work & Community Health |
| **Occupation** | Counselling |
| **Country** | India |
| **NSQF Level** | 5 |
| **Aligned to NCO/ISCO/ISIC Code** | NCO-2015/NIL |
| **Minimum Educational Qualification and Experience** | • Master's in public health (MPH)<br>or<br>• Graduates (life sciences/ MBBS/ B.Sc. nursing/clinical psychology/ biotechnology/ pharmacy/ BDS/ B. Tech Biotechnology or genetics) |
| **Pre-Requisite License or Training** | Not Applicable |
| **Minimum Job Entry Age** | 21 Years |
| **Last Reviewed On** | 19-06-2020 |
| **Next Review Date** | 28-07-2025 |
| **NSQC Approval Date** | 28-07-2022 |

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|---|---|
| **QP Version** | 1.0 |
| **Model Curriculum Creation Date** | 19-06-2020 |
| **Model Curriculum Valid Up to Date** | 28-07-2025 |
| **Model Curriculum Version** | 1.0 |
| **Minimum Duration of the Course** | 1500 Hrs. |
| **Maximum Duration of the Course** | 1500 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 the skills necessary to successfully manage a genetic counseling case.
- Facilitate informed decision making in selecting genetic tests and management/ treatment methodology.
- 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.

## 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 |
|---|---|---|---|---|
| **Module 1: Bridge Modules** | **15:00** | **15:00** | **30:00** | **60:00** |
| Module 1: Introduction to healthcare delivery systems | 04:00 | 05:00 | 00:00 | 00:00 |
| Module 2: Structure and function of human body | 07:00 | 05:00 | 00:00 | 00:00 |
| Module 3: Basic computer knowledge | 04:00 | 05:00 | 00:00 | 00:00 |

| | | | | |
|---|---|---|---|---|
| **HSSC/N8713: Collect detailed patient and family history to draw a pedigree<br>NOS Version 1.0<br>NSQF Level 5** | **90:00** | **60:00** | **60:00** | **210:00** |
| Module 4: Role and responsibilities of a genetic counselor | 10:00 | 08:00 | 00:00 | 00:00 |
| Module 5: Principles ofGenetics | 28:00 | 10:00 | 00:00 | 00:00 |
| Module 6: Human and Medical Genetics | 28:00 | 10:00 | 00:00 | 00:00 |
| Module 7: Family History and Pedigree Analysis | 24:00 | 32:00 | 00:00 | 00:00 |
| **HSS/N8714 : Assess risk for genetic disorders or syndromes<br>Version 1.0<br>NSQF Level 5** | **30:00** | **30:00** | **60:00** | **120:00** |
| Module 8: Categories ofgenetic diseases | 10:00 | 8:00 | 00:00 | 00:00 |
| Module 9: Prenatal and Pre-implantation genetic tests | 20:00 | 22:00 | 00:00 | 00:00 |
| **HSS/N8715: Provide counselling on various genetic tests and coordinate for their execution<br>Version 1.0<br>NSQF Level 5** | **15:00** | **30:00** | **45:00** | **90:00** |
| Module 10: Screening and diagnostic tests | 15:00 | 30:00 | 00:00 | 00:00 |
| **HSS/N8716 : Interpret the inferences of the genetic tests and carryout post- test counselling<br>Version 1.0<br>NSQF Level 5** | **30:00** | **60:00** | **90:00** | **180:00** |
| Module 11: Chromosome studies, Cytogenetics, FISH and Microarray | 24:00 | 30:00 | 00:00 | 00:00 |
| Module 12: Documentation and record keeping in genetics | 06:00 | 30:00 | 00:00 | 00:00 |

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|---|---|---|---|---|
| **HSS/N8717: Provide need- based genetic counselling to the patient and their family members Version 1.0 NSQF Level 5** | **180:00** | **210:00** | **120:00** | **510:00** |
| Module 13: Adult genetic counseling | 28:00 | 30:00 | 00:00 | 00:00 |
| Module 14: Developmental, reproductive and infertility genetics | 28:00 | 30:00 | 00:00 | 00:00 |
| Module 15: Paediatric counseling | 28:00 | 30:00 | 00:00 | 00:00 |
| Module 16: Cancer genetic counseling | 28:00 | 30:00 | 00:00 | 00:00 |
| Module 17: Neurogenetics and psychiatric genetics | 28:00 | 30:00 | 00:00 | 00:00 |
| Module 18: Process of genetic counseling | 28:00 | 30:00 | 00:00 | 00:00 |
| Module 19: Interpersonal, psychosocial, and soft skills in genetic counselling | 12:00 | 30:00 | 00:00 | 00:00 |
| **HSS/N8718: Promote genetics related awareness Version 1.0 NSQF Level 5** | **45:00** | **90:00** | **60:00** | **195:00** |
| Module 20: Population genetics | 14:00 | 16:00 | 00:00 | 00:00 |
| Module 21: Culture and ethnicity | 07:00 | 16:00 | 00:00 | 00:00 |
| Module 22: Community awareness in genetic counseling | 12:00 | 30:00 | 00:00 | 00:00 |
| Module 23: Genetics awareness at hospital level | 12:00 | 28:00 | 00:00 | 00:00 |
| **HSS/N9615: Maintain inter-personal relationship with patients, colleagues and others** | **15:00** | **15:00** | **15:00** | **45:00** |

| | | | | |
|---|---|---|---|---|
| **Version 1.0<br>NSQF Level 4** | | | | |
| Module 24: Maintain interpersonal relationship with colleagues and others | 15:00 | 15:00 | 00:00 | 00:00 |
| **HSS/N9616: Maintain professional & medico-legal conduct<br>Version 1.0<br>NSQF Level 4** | **15:00** | **15:00** | **15:00** | **45:00** |
| Module 25: Ethical, legal and philosophical principles in genetic counselling | 15:00 | 16:00 | 00:00 | 00:00 |
| **HSS/N9618: Follow infection control policies and procedures including biomedical waste disposal protocols<br>Version 1.0<br>NSQF Level 4** | **15:00** | **15:00** | **15:00** | **45:00** |
| Module 26: Infection control policies and procedures and Bio-medical waste management | 15:00 | 15:00 | 00:00 | 00:00 |
| **Total** | **450:00** | **540:00** | **510:00** | **1500:00** |

# Module Details

## Module 1: Introduction to healthcare delivery systems

***Bridge Module***

**Terminal Outcomes:**

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

| **Duration**: *04:00* | **Duration**: *05:00* |
|---|---|
| **Theory – Key Learning Outcomes** | **Practical – Key Learning Outcomes** |
| • Discuss about the healthcare delivery system in India at primary, secondary, tertiary, and quaternary level.<br>• Distinguish between private, public, and non-profit healthcare delivery systems.<br>• Differentiate between various healthcare services.<br>• List different organizations related to genetics such as medical genetics, genetic counseling clinics/ departments.<br>• Explain the role and responsibilities of the genetic counselor at different clinical sites such as, pre-natal, paediatric, specialty, adult genetics, cancer, and general genetics clinics. | • Prepare a report summarizing the basic structure and function of healthcare delivery system in India. |
| **Classroom Aids:** | |
| Charts, Models, Video presentation, Flip Chart, White-Board/Smart Board, Marker, Duster | |
| **Tools, Equipment and Other Requirements** | |
| Visit to genetics clinics and departments for field assignment | |

## Module 2: Structure and functions of human body

***Bridge Module***

**Terminal Outcomes:**

- Apply the knowledge of basic structure and function of the various body systems and its associated components during assistance to healthcare services provider.

| **Duration**: *07:00* | **Duration**: *05:00* |
|---|---|
| **Theory – Key Learning Outcomes** | **Practical – Key Learning Outcomes** |
| • List various body parts in a human.<br>• Explain the organisation of body cells, tissues, organs, organ systems, membranes, and glands in the human body.<br>• Describe cell and various types of tissues.<br>• Describe different types of organ systems.<br>• Describe basic function of vital organs.<br>• Discuss different types of body fluids, secretions, and excretions. | • Identify different parts of the body using charts and models.<br>• Explain the structure and functioning of human body systems using charts and models.<br>• Design various working models depicting functioning of human body systems. |
| **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: Basic computer knowledge

***Bridge Module***

**Terminal Outcomes:**

- Demonstrate the use of computers and internet operations.
- Apply basic computer knowledge in performing various activities

| **Duration**: *04:00* | **Duration**: *05:00* |
|---|---|
| **Theory – Key Learning Outcomes** | **Practical – Key Learning Outcomes** |
| • List the fundamental hardware components that make up a computer's hardware and the role of each of these components.<br>• Distinguish between an operating system and an application program, and what each is used for in a computer.<br>• Identify the principal components of a given computer system. | • Demonstrate data entry, taking backups, saving, and retrieving the files, maintaining, and changing network connectivity process.<br>• Prepare reports/documents using word processing software and spreadsheets.<br>• Demonstrate the use of web browsers to surf on the Internet, send emails. |
| **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 | |

# Module 4: Role and responsibilities of a genetic counselor

***Mapped to: HSS/N8713, V1.0***

**Terminal Outcomes:**

- Describe the key roles and responsibilities of a genetic counselor.

| **Duration**: *10:00* | **Duration**: *08:00* |
|---|---|
| **Theory – Key Learning Outcomes** | **Practical – Key Learning Outcomes** |
| • Explain the role and responsibilities of a genetic counselor.<br>• Distinguish between the scope of practice of a genetic counselor and that of other healthcare professionals such as medical geneticists.<br>• Discuss the roles of multi-disciplinary genetics team personnel.<br>• Discuss the history of genetics and development of genetic counselors in India.<br>• Explain challenges and limitations of genetic counselors. | • Create a flow chart depicting roles and responsibilities of a genetic counselor at different sites.<br>• Demonstrate effective interaction with other professionals to promote appropriate implementation of genetic services. |
| **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<br>Field visits to organizations such as genetics departments, clinics etc. | |

## Module 5: Principles of Genetics

***Mapped to: HSS/N8713, V1.0***

**Terminal Outcomes:**

- Describe the foundational concepts and principles related to genetics.

| **Duration**: *28:00* | **Duration**: *10:00* |
|---|---|
| **Theory – Key Learning Outcomes** | **Practical – Key Learning Outcomes** |
| • Explain the structure and function of chromosomes, gene and DNA.<br>• Discuss the process of DNA and RNA replication, transcription, translation, etc<br>• Discuss the concepts and problems of human genetics.<br>• Explain in brief the flow of information, gene regulation, chromatin, epigenetics, chromatin, genome integrity, and repair.<br>• Explain the concept of genes or genomes related to phenotypes and human pathophysiology.<br>• Describe the principles of human, medical, and public health genetics, and their related sciences.<br>• 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.<br>• Explain the fundamentals of population and quantitative genetics.<br>• Describe the fundamentals of human variation and disease susceptibility.<br>• Outline the application of genetics in prenatal, paediatric, adult, personalized genomic medicine, cytogenetics, biochemical, molecular medicine, cardiovascular, neurogenetics, pharmacogenetics and psychiatric genetics. | • Prepare a chart depicting differences in Mendelian and non-Mendelian inheritance patterns.<br>• Draw the diagrams of chromosomes, DNA and RNA differentiating their basic frameworks.<br>• Prepare visual representations of processes of transcription and translation. |
| **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 | |

# Module 6: Human and Medical Genetics

***Mapped to: HSS/N8713, V1.0***

**Terminal Outcomes:**

- Differentiate between human and medical genetics.
- Develop a deeper understanding on various concepts related to human and medical genetics.

| **Duration**: *28:00* | **Duration**: *10:00* |
|---|---|
| **Theory – Key Learning Outcomes** | **Practical – Key Learning Outcomes** |
| • Discuss human genome, genome organization, annotations and databases, markers (microsatellites, SNPs).<br>• Explain mitochondrial genome and disorders.<br>• Describe the concept of human and medical genetics and the difference between the two.<br>• Correlate genotype-phenotype.<br>• Discuss the multifactorial and threshold trait.<br>• Explain genetic susceptibility & risk factors.<br>• Explain the concept of pharmacogenomics, ecogenomics, metabolomics, teratogenesis.<br>• Discuss allele frequency in population and estimation of carrier frequency.<br>• Explain the principles of inheritance and probability rules such as polygenic inheritance.<br>• Differentiate between the sex-linked and X-linked inheritance patterns.<br>• Explain the concept of Mosaicism, dynamic mutations, imprinting, maternal inheritance, multifactorial inheritance.<br>• Explain single-gene and complex inheritance.<br>• Discuss the autosomal patterns of inheritance.<br>• Correlate mutations and chromosomal abnormalities to disease.<br>• List various molecular defects that lead to various classes of genetic disease.<br>• Discuss in brief the biochemical testing. | • Analyse the application of genetic engineering, modifications and its implications on the environment and society.<br>• Demonstrate the process of identifying phenotypes or physical attributes of people.<br>• Create charts of various inheritance patterns such as sex-linked, X-linked, polygenic inheritance. |
| **Classroom Aids:** | |
| Charts, Models, Video presentation, Flip Chart, White-Board/Smart Board, Marker, Duster | |
| **Tools, Equipment and Other Requirements** | |
| | |

## Module 7: Family History and Pedigree Analysis

***Mapped to: HSS/N8713, V1.0***

**Terminal Outcomes:**

- Explain the process of obtaining family history.
- Assess inheritance patterns using pedigree analysis.

| **Duration**: *24:00* | **Duration**: *32:00* |
|---|---|
| **Theory – Key Learning Outcomes** | **Practical – Key Learning Outcomes** |
| • Discuss various communication and interviewing skills to elicit a family history and pursue a relevant path of inquiry.<br>• Describe the significance of medical, developmental, pregnancy and psychosocial histories in pedigree analysis and risk assessment.<br>• Explain the concept of developmental, perinatal, family history.<br>• Discuss the process of obtaining medical history.<br>• List various symbols used in drawing pedigree chart and their meaning.<br>• Explain pedigree construction & family study.<br>• Describe the complications in pedigree analysis such as variable expressivity, heterogeneity, penetrance, anticipation, epigenetics, Mosaicism.<br>• Discuss the process of clinical case preparation.<br>• Explain the methodology of risk evaluation- Mendelian risk, empirical risk.<br>• Describe various methodologies of mapping and identification of disease genes such as linkage analysis, LOD score, association study.<br>• Identify relevant information about environmental and lifestyle factors into the risk assessment. | • Formulate structured questions for sample individual cases regarding medical history and/or potential diagnoses to draw pedigree.<br>• Draw sample pedigree charts with the use of pedigree symbols, standard notation, and nomenclature.<br>• Demonstrate the method of assessing sample genetic risk.<br>• Review sample profiles to extract information related to medical, developmental, pregnancy and psychosocial histories.<br>• 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 8: Categories of genetic diseases

***Mapped to: HSS/N8714, V1.0***

**Terminal Outcomes:**

- 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.<br>• Discuss various chromosomal abnormalities Numerical (polyploidy, aneuploidy, autosomal), structural (deletion, duplication, translocation), microdeletions etc.<br>• Discuss the single gene disorders abnormalities such as Cystic Fibrosis, Marfan's syndrome.<br>• Discuss the multifactorial genetic abnormalities such as Diabetes, Atherosclerosis, Schizophrenia.<br>• Explain the significance of mutations in either breast cancer gene, BRCA1 or BRCA2.<br>• Discuss different acquired somatic abnormalities. | • Demonstrate the method of identifying physical attributes associated with various genetic disorders. |
| **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 9: Prenatal and Pre-implantation genetic tests

***Mapped to: HSS/N8714, V1.0***

**Terminal Outcomes:**

- Discuss various pre-implantation and pre-natal genetic screening and diagnostic tests.
- Describe legal and ethical issues surrounding pre-natal genetic testing.

| **Duration**: *20:00* | **Duration**: *22:00* |
|---|---|
| **Theory – Key Learning Outcomes** | **Practical – Key Learning Outcomes** |
| • Explain the different types and benefits of prenatal and pre-implantation genetic screening tests.<br>• Describe the first, second and third and combined first, second and third trimester screening.<br>• Describe the non-invasive techniques of diagnosis such as Triple test, Ultrasonography (USG), cell-free DNA testing etc.<br>• Describe the invasive techniques of diagnosis such as Amniocentesis (AC), chorionic villi sampling (CVS), Foetal Blood Sampling (FBS).<br>• Describe standard features of a pre-natal counselling session such as reviewing patient/ partner's medical, pregnancy and family history, identification of risks etc.<br>• Explain the significance of different standard results of prenatal screening tests.<br>• Explain the significance of history of infertility, multiple miscarriages, or stillbirth.<br>• Describe the concept, significance, and process of informed decision.<br>• Describe the methodology of interpreting prenatal and pre-implantation screening test results.<br>• Describe the process of providing information about the risks of chromosomes abnormalities, birth defects or other genetic conditions to individuals, couples, or families. | • Demonstrate the process of preparing a sample schedule of a potential candidate.<br>• Draft standard questions such as pregnancy history, current and past pregnancies, births and miscarriages, terminations or abortions and pregnancy complications.<br>• Demonstrate the process of obtaining informed consent for procedures.<br>• Demonstrate the process of interviewing clients.<br>• Demonstrate assessment of the risks of an inherited disorder in a sample case study.<br>• Demonstrate addressing queries related to the pre-natal tests in sample case scenarios.<br>• Demonstrate filling various sample forms/ formats required.<br>• Demonstrate the use of verbal and non-verbal communication to provide emotional support during a mock counselling session.<br>• 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<br>• Create a sample plan of referrals for consultations with relevant specialties and investigations, and pre-test counseling. |
| **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 10: Screening and diagnostic tests

***Mapped to: HSS/N8715, V1.0***

**Terminal Outcomes:**

- Differentiate between screening and diagnostic tests.

| **Duration**: *15:00* | **Duration**: *30:00* |
|---|---|
| **Theory – Key Learning Outcomes** | **Practical – Key Learning Outcomes** |
| • Distinguish screening tests with diagnostic tests.<br>• List various molecular defects that lead to various classes of genetic diseases.<br>• Describe the cytogenetic methods of genetic testing like karyotyping, FISH.<br>• Describe the molecular testing methods like PCR-RFLP, ARMS-PCR, Multiplex-PCR, SSCP, CSGE, DGGE, DHPLC, MALDI-TOF, DNA Sequencing etc.<br>• Explain the process of identifying diseases and genetic tests for thalassemia, Fanconi anaemia, Sickle Cell anaemia, Fragile-X syndrome, Alzheimer's disease, Duchenne Muscular Dystrophy/Becker's Muscular Dystrophy, Huntington's disease.<br>• Describe Allelic susceptibility test for multifactorial disorders like Neural Tube Defects (NTDs), cleft lip and palate, cardio-vascular disorders, male infertility.<br>• Explain the biochemical testing methods.<br>• 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.<br>• Describe the application and use of various genetic tests.<br>• Explain the guidelines for genetic tests.<br>• Discuss the economic aspects of the genetic tests. | • Create a sample plan for coordinating screening and diagnostic genetic testing.<br>• Evaluate familial implications of genetic/genomic test results.<br>• Analyse 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.<br>• Demonstrate the process of conducting risk assessment by analysing the results of mock screening, diagnostic and predictive genetic/genomic tests.<br>• Demonstrate the process of explaining the results of genetic tests such as results of screening tests, chromosomal, biochemical, and molecular diagnosis to the client.<br>• Demonstrate the process of determining the mode of inheritance and risk of occurrence and recurrence of the genetic condition/birth defect. |
| **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 11: Chromosome studies, Cytogenetics, FISH and Microarray

***Mapped to: HSS/N8716, V1.0***

**Terminal Outcomes:**

- Discuss the concept of chromosome studies.
- Describe the concepts and principles of cytogenetics, FISH, and microarray in detail.

| **Duration**: *24:00* | **Duration**: *30:00* |
|---|---|
| **Theory – Key Learning Outcomes** | **Practical – Key Learning Outcomes** |
| • Explain the concepts of organization of cell and cell cycle, cell division (Mitosis, Meiosis).<br>• Describe the chromosomal basis of inheritance, sex chromosome, X-chromosome inactivation.<br>• Discuss the concept and techniques of cell culture.<br>• Discuss the nomenclature of human chromosomes.<br>• Explain various chromosomal abnormalities and their implications.<br>• Explain the techniques of chromosome analysis.<br>• Discuss various chromosomal anomalies and disorders.<br>• Discuss the various chromosome studies available to determine whether a child has a genetic birth defect.<br>• Discuss the concept of karyotype and its advantages and disadvantages.<br>• Explain the events in which karyotype testing is recommended.<br>• Describe the concept, procedure, principle, merits of Fluorescence In Situ Hybridization (FISH).<br>• Discuss in brief the Chromosomal Microarray Analysis (CMA), its types, process, significance, and application. | • Create visual representations of process of mitosis and meiosis.<br>• Demonstrate the use of software to analyze karyotypes and FISH.<br>• Evaluate sample reports of FISH and microarray.<br>• Demonstrate correlating inference of the test results with the sample case history. |
| **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 12: Documentation and record keeping in genetics

***Mapped to: HSS/N8716, V1.0***

**Terminal Outcomes:**

- Demonstrate technical skills of creating, updating and retrieval of the database.
- Carry out proper documentation of genetic counselling sessions.

| **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.<br>• List different standard documents to be procured from the patient.<br>• Explain the purpose of obtaining written consent of authorized officer before sharing any patient related information to others.<br>• Describe the process of organizing and scheduling clinic activities, including patient visits, diagnostic tests, and follow-up.<br>• Describe the process of storing patient information will be stored and how can it be accessed. | • Prepare a sample database of patients, incoming calls, and consultation records in genetics department.<br>• Demonstrate application of standard norms and legislation for completing and documenting clinical and procedure related records.<br>• Demonstrate maintaining of documents of genetic counselling session in a format consistent with the standard practice of the organization.<br>• Demonstrate the process of providing written documentation of medical, genetic, and counselling information for families and other health professionals.<br>• Demonstrate the process of recording sample patient information in the HIS. |
| **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 13: Adult genetic counseling

***Mapped to: HSS/N8717, V1.0***

**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**: *28:00* | **Duration**: *30:00* |
|---|---|
| **Theory – Key Learning Outcomes** | **Practical – Key Learning Outcomes** |
| • Explain the concept of adult genetic counselling and its significance.<br>• List various areas that come under adult genetic counseling such as cardiovascular genetics etc.<br>• Discuss the significance of symptoms and family history in adult genetic counselling.<br>• Describe familial hypercholesterolemia, muscular dystrophy and other muscle diseases.<br>• Discuss inherited movement disorders such as Huntington's disease.<br>• Describe inherited blood disorders such as sickle cell disease.<br>• Explain various cardiovascular disorders such as Marfan syndrome, Loeys Dietz syndrome, vascular EDS, bicuspid aortic valve, thoracic aortic aneurysms etc.<br>• Describe various endocrine disorders such as, hypogonadotropic hypogonadism<br>• Describe various endocrine disorders such as retinal dystrophy, hereditary glaucoma.<br>• Discuss genetic ENT disorders such as hereditary hearing loss- non-syndromic and syndromic.<br>• Discuss the gastro- intestinal disorders like chronic pancreatitis<br>• Describe various immunologic disorders such as hereditary Mediterranean fever, familial auto-inflammatory disorders etc.<br>• Explain the pulmonary and renal diseases like idiopathic pulmonary fibrosis, Cystic diseases of kidney, Alport syndrome, disorder with or without dysmorphic features etc.<br>• Discuss the management of patients with a known genetic condition as they transition to adulthood.<br>• 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.<br>• Review sample case histories for calculating the risk of late-onset inherited diseases.<br>• 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 14: Developmental, reproductive and infertility genetics

***Mapped to: HSS/N8717, V1.0***

**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**: *28:00* | **Duration**: *30:00* |
|---|---|
| **Theory – Key Learning Outcomes** | **Practical – Key Learning Outcomes** |
| • Explain the human reproductive system, reproductive organs, and gonads.<br>• Differentiate between normal and abnormal physical and psychological development.<br>• Outline the human development and developmental disorders such as DiGeorge syndrome, neural tube defect, cleft lip and palate, microcephaly etc.<br>• Describe the etiology for abnormal embryological development.<br>• Explain the etiology and pathogenesis in dysmorphology.<br>• Explain the study of dysmorphology, and the embryological timing for abnormal development, including congenital malformations.<br>• Explain the distinction between malformations, deformations, disruptions and dysplasia, syndromes, associations, and sequences.<br>• Discuss the concept of teratogen influence.<br>• Explain birth defect mechanism, common birth defects and their evaluation process.<br>• Describe the concept of sex determination and hormonal basis of sexual differentiation.<br>• Describe various reproductive disorders such as male/ female infertility, endometriosis, recurrent early pregnancy loss, polycystic ovarian disorder.<br>• List conditions that requires referral to an ART/infertility genetic counselor such as Males with severe oligospermia or non-obstructive azoospermia.<br>• Discuss the Genetic risk assessment in case of infertility.<br>• Define Assisted Reproductive technologies (ART).<br>• Describe various ethical and legal issues related to reproductive studies in Indian context such as Pre-Conception and Pre- | • Create visual representations of stages of human embryo development.<br>• Review at least three generations of family history.<br>• Analyse sample case studies of congenital malformations.<br>• Evaluate sample cases of male and female infertility.<br>• Prepare a sample plan to approach for identification and diagnosis of sample developmental disorders.<br>• Demonstrate the process of explaining the diagnosis, etiology, natural history, monitoring and management of a genetic disorder.<br>• Demonstrate the process of providing counseling for reproductive options including prenatal diagnosis and anticipatory guidance.<br>• Demonstrate assisting a client in understanding the complexities of genetic testing, including limitations and benefits, and their impact.<br>• Demonstrate the process of carrying out a pre-natal, pre-conception, post-conception genetic counselling session.<br>• Demonstrate the process of providing information of next steps in the event of positive diagnosis. |

| | |
|---|---|
| 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 15: Paediatric counseling

***Mapped to: HSS/N8717, V1.0***

**Terminal Outcomes:**

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

| **Duration**: *28:00* | **Duration**: *30:00* |
|---|---|
| **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.<br>• Describe paediatric genetic disorders such as neurological, neuromuscular, connective tissue, vision or hearing disorders and Bone dysplasia etc.<br>• List various birth defects, such as spina bifida, cleft palate, brain malformations or heart defects, abnormal stature, or growth etc.<br>• 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.<br>• Discuss the role of genetic counselor in transition of patients from pediatric to adult care.<br>• Discuss the risk of having an inherited disease that affects one's health in adulthood such as mitochondrial disorders, Fabry disease and Marfan syndrome . | • Prepare charts of inborn errors of metabolism.<br>• Examine the possibility of other family members having a child with an inherited disease.<br>• Evaluate the risk of having another child with a genetic disorder in sample case studies.<br>• Demonstrate the process of carrying out genetic counselling sessions for positive diagnosis in sample scenarios.<br>• 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 16: Cancer genetic counseling

***Mapped to: HSS/N8717, V1.0***

**Terminal Outcomes:**

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

| **Duration**: *28:00* | **Duration**: *30:00* |
|---|---|
| **Theory – Key Learning Outcomes** | **Practical – Key Learning Outcomes** |
| • Describe the cancer biology.<br>• Explain the concept of familial cancer syndromes.<br>• Discuss the molecular basis of cancer.<br>• Describe the method of cancer risk assessment.<br>• Determine whether or not the history is suggestive of an inherited cancer syndrome.<br>• List various genetic testing options for cancers.<br>• Explain the chromosomal abnormalities in cancer.<br>• 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.<br>• List conditions that requires referral to a genetic counselor such as cancer diagnosed at an unusually young age (e.g. breast or colon cancer before age 50).<br>• Explain the process of assessing the risk of developing cancer-based on the collected information.<br>• Describe the genetic basis of inherited cancer and cancer syndromes,<br>• Outline the development and treatment of cancers. | • Create charts on common genetic cancers and their clinical presentation.<br>• Collect a detailed cancer-focused personal and family medical history.<br>• Demonstrate assessment of cancer risk inheritance in sample case studies.<br>• Demonstrate supporting clients and first family members on pre-symptomatic testing in high risk cases.<br>• Demonstrate carrying out counselling session on genetic tests related to cancer diagnosis.<br>• Review sample medical management options with or without genetic testing.<br>• Demonstrate the process of breaking bad news in the event of cancer diagnosis with guarded prognosis.<br>• Demonstrate the process of providing psychosocial support to patients and families and facilitating communication between patients and their families regarding risk information and recommendations.<br>• Create follow up plans in sample cancer case studies. |
| **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: Neurogenetics and psychiatric genetics

***Mapped to: HSS/N8717, V1.0***

**Terminal Outcomes:**

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

| **Duration**: *28:00* | **Duration**: *30:00* |
|---|---|
| **Theory – Key Learning Outcomes** | **Practical – Key Learning Outcomes** |
| • Explain the concept of psychiatric genetics, neurogenetics and neurodegeneration.<br>• Correlate neurogenetics, genetics, neuroscience, psychology, and psychiatry.<br>• Describe different Muscular dystrophies/myopathies like dystrophin-associated, congenital muscular dystrophies, facioscapulohumeral muscular dystrophy, limb girdle weakness, myotonia, oculopharyngeal muscular dystrophy.<br>• Explain various motor neuron diseases such as peripheral neuropathy, ALS, spinal muscular atrophy.<br>• Describe the Hereditary movement disorders, e.g., ataxia, dystonia, spastic paraplegia, Huntington's chorea, Parkinsonism.<br>• Explain various neuropsychiatric disorders such as Attention Deficit Hyperactivity Disorder (ADHD), anxiety disorders, autistic spectrum disorders, bipolar disorder, major depressive disorder, and schizophrenia.<br>• List various disorders where a person have unexplained elevated CK levels, ptosis, facial weakness, muscle atrophy etc.<br>• Explain the benefit of neurogenetics counseling. | • Collect complete patient and family history.<br>• Demonstrate the process of identifying the family members at risk for an inherited neurogenetic condition.<br>• Demonstrate the process of identifying symptoms of neurogenetic diseases such as ADHD, Parkinson's disease etc.<br>• Demonstrate the process of providing information about genetic testing and family planning options to individuals.<br>• Demonstrate the method of carrying out counselling sessions in psychiatric disorders.<br>• 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 18: Process of genetic counseling

***Mapped to: HSS/N8717, V1.0***

**Terminal Outcomes:**

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

| **Duration**: *28:00* | **Duration**: *30:00* |
|---|---|
| **Theory – Key Learning Outcomes** | **Practical – Key Learning Outcomes** |
| • Identify situations in which genetic counseling is warranted.<br>• Discuss the principles of genetic counseling.<br>• Explain the process for pre-consultation contact.<br>• List basic agenda points used during consultation.<br>• Explain the process of preparation for genetic consultation.<br>• Explain the diagnosis, etiology, natural history, monitoring and management of a genetic disorder.<br>• Discuss the methods of facilitating decision-making.<br>• Discuss the process of promoting informed choices in view of risk assessment, family goals, ethical and religious values.<br>• Describe the risk of recurrence of a genetic disorder.<br>• Discuss options regarding disease management, the risks and benefits of further testing and other options.<br>• List psychosocial tools required to cope with potential outcomes. | • Use appropriate counselling techniques like listening, observing, reflecting etc. to address client expectations, perceptions, knowledge, and concerns.<br>• Demonstrate the process of assessing prior and current psychological state of clients in sample case scenarios.<br>• Demonstrate the process of providing information about natural history of the condition, inheritance pattern, testing, management, prevention, support resources.<br>• Demonstrate the process of obtaining informed consent.<br>• Demonstrate carrying out a mock counseling session in different case scenarios such as cases of metabolic, cardiovascular disorders etc. |
| **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 19: Interpersonal, psychosocial, and soft skills in genetic counselling

***Mapped to: HSS/N8717, V1.0***

**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**: *12:00* | **Duration**: *30:00* |
|---|---|
| **Theory – Key Learning Outcomes** | **Practical – Key Learning Outcomes** |
| • Discuss the significance and techniques of counselling in genetics.<br>• Describe the basics of psychosocial, interpersonal, and counselling skills such as perception, building a rapport and giving news.<br>• Explain the range of patient emotions, individual and family experiences, beliefs, behaviours, values, coping mechanisms, and adaptive capabilities.<br>• Discuss the importance of effective communication with patients, relatives, and colleagues.<br>• Discuss about confidentiality and privacy practices related to patient's information.<br>• Discuss about the importance of following rules and policies of organization for maintaining code of conduct and scope of work.<br>• Compare strengths and limitations of different counselling models.<br>• Discuss various client emotions, individual and family experiences, beliefs, behaviours, values, coping mechanisms, and adaptive capabilities.<br>• Explain the importance of forming the interpersonal/therapeutic relations.<br>• 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.<br>• Apply active listening and interviewing skills to identify, assess, and empathically respond to concerns.<br>• Demonstrate problem solving and decision-making skills in different situations.<br>• Demonstrate skills of team- work and work prioritization in different team activities.<br>• Demonstrate basic telephone and email etiquettes.<br>• Prepare reports using the information gathered from observation, experience, reasoning, or communication.<br>• Evaluate client emotions, individual and family experiences, beliefs, behaviours, values, coping mechanisms, and adaptive capabilities.<br>• Demonstrate the process of assessing client emotional and behavioural 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 20: Population genetics

***Mapped to: HSS/N8718, V1.0***

**Terminal Outcomes:**

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

| **Duration**: *14:00* | **Duration**: *16:00* |
|---|---|
| **Theory – Key Learning Outcomes** | **Practical – Key Learning Outcomes** |
| • Discuss the concepts of demographic cycle.<br>• Explain the Demographic trend in India.<br>• Explain the National population policy 2000.<br>• Discuss the concept of family planning and its importance.<br>• Explain the concept and advantages of population genetics.<br>• Explain the patterns of human genetic variation among populations and among individuals.<br>• Discuss the basics of genetic epidemiology including interpretation of large-scale, population based genetic studies.<br>• Explain the probability theory.<br>• Discuss how theories of human genetics can be applied to populations.<br>• Discuss segregation and linkage analysis.<br>• Explain the Bayesian Theorem.<br>• Discuss the influence of evolutionary factors on variation.<br>• Discuss in brief the four major factors of evolution – mutation, natural selection, genetic drift and gene flow.<br>• Discuss how much do human populations differ.<br>• 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.<br>• Demonstrate the application of Hardy Weinberg equilibrium equation for calculating the genetic variation of a sample population at equilibrium.<br>• 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 21: Culture and ethnicity

***Mapped to: HSS/N8718, V1.0***

**Terminal Outcomes:**

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

| **Duration**: *07:00* | **Duration**: *16:00* |
|---|---|
| **Theory – Key Learning Outcomes** | **Practical – Key Learning Outcomes** |
| • Distinguish between the concept of ethnicity and race.<br>• Discuss the health disparities.<br>• Describe race and genetic variation.<br>• Describe how aspects of culture including language, ethnicity, life- style, socioeconomic status, disability, sexuality, age, and gender affect the genetic counseling encounter.<br>• Explain how the genetic counselor's personal, cultural characteristics and biases may impact patient counselling.<br>• Describe the process of assessing and responding to client cultural beliefs relevant to the genetic counseling. | • Apply knowledge of cultural and religious knowledge to plan out the session for genetic counseling session.<br>• Prepare a sample questionnaire considering the cultural aspects.<br>• Prepare a sample response sheet on queries pertaining to religious beliefs.<br>• 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 22: Community awareness in genetic counseling

***Mapped to: HSS/N8718, V1.0***

**Terminal Outcomes:**

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

| **Duration**: *12:00* | **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.<br>• Identify factors that affect the learning process such as socioeconomic factors, religious and cultural beliefs, language, and educational background, etc.<br>• Describe the process of communicating the relevant information to help clients understand and adapt to conditions.<br>• Discuss client concerns that may arise about privacy related protections.<br>• List common values, attitudes, perceptions of clients, families, and the communities related to genetic diseases.<br>• Discuss various strategies to increase/promote population, newborn, prenatal screening.<br>• Discuss the methods to recognize and address potential tension between the values of clients, families, communities and the genetic counseling profession.<br>• Identify various genetic professional organizations in the community.<br>• List the signs of consanguinity and inbreeding in the community.<br>• Describe strategies that increase/promote access to genetic counseling services. | • Draft a sample survey plan/ questionnaire to gauge the knowledge of the community.<br>• Apply risk communication principles to maximize client understanding.<br>• Create IEC material to enhance the learning such as handouts, visual aids, and other educational technologies.<br>• Demonstrate the process of organizing and schedule community activities, such as screening clinics/camps and school visits.<br>• 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.<br>• 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 23: Genetics awareness at hospital level

***Mapped to: HSS/N8718, V1.0***

**Terminal Outcomes:**

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

| **Duration:** *12:00* | **Duration:** *28:00* |
|---|---|
| **Theory – Key Learning Outcomes** | **Practical – Key Learning Outcomes** |
| • Determine need of education related to genetics in the hospital.<br>• Describe the process of creating, implementing, and modifying specific hospital action plans related to genetics.<br>• List the steps of carrying out Knowledge, Attitude and Practices (KAP) analysis of the hospital staff related to genetics.<br>• Describe the process of planning and conducting Continuing Medical Education (CME)/ Continuing Nursing Education (CNE) sessions.<br>• Discuss opportunities for participation and leadership.<br>• Outline the importance of maintaining and improving one's own professional education and competence.<br>• Describe the concept of telegenetics and its importance in aiding the practice of genetic counselling.<br>• Explain the provisions and limitations of telegenetics. | • Create a sample awareness plan related to genetic disorder and management.<br>• Create a sample blueprint of agenda and topics of training session for CME and CNE.<br>• Draft a roadmap of rolling out training session according to varied audiences.<br>• Create reports on feedback and results of session plans.<br>• Demonstrate the process of impact analysis in awareness sessions in the organizations.<br>• Demonstrate the process of collaborating with marketing team for creation of IEC material.<br>• Demonstrate the process of facilitating an online genetic counseling session. |
| **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 24: Maintain interpersonal relationship with colleagues and others

***Mapped to: HSS/N9615, v1.0***

**Terminal Outcomes:**

- Discuss the importance of maintaining professional relationships with co-workers in the organization.

| **Duration**: *15:00* | **Duration**: *15:00* |
|---|---|
| **Theory – Key Learning Outcomes** | **Practical – Key Learning Outcomes** |
| • Describe the importance for ensuring fulfilment of commitments.<br>• Explain organization's policies and procedures.<br>• Discuss the importance of effective communication amongst colleagues<br>• Discuss one's role in the genetics team. | • Apply appropriate and timely communication between inter and intra<br>• Departments.<br>• Maintain confidentiality and privacy.<br>• Maintain a positive work friendly milieu.<br>• Demonstrate one's role in the genetics team.<br>• Build and maintain the necessary collaborative relationships with co-workers at all levels.<br>• provide 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** | |
| Sample formats of reports and hospital documents | |

## Module 25: Ethical, legal, and philosophical principles in genetic counselling

***Mapped to: HSS/N9616, V1.0***

**Terminal Outcomes:**

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

| **Duration**: *15:00* | **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.<br>• Outline code of medical ethics.<br>• Explain the method of identifying and addressing ethical and moral dilemmas in genetic counseling practice.<br>• Discuss the importance and requirements of consent and maintaining confidentiality.<br>• Identify factors that promote client autonomy.<br>• Ascertain and comply with current professional credentialing requirements, at the institutional, state, regional and national level.<br>• List the situations that may result in a real or perceived conflict of interest.<br>• Explain the indications and grounds of the Medical Termination of Pregnancy Act, 1971<br>• Discuss the requirements for MTP, complications of MTP<br>• Explain the criminal abortion.<br>• Describe the regulation of genetic counseling centre.<br>• Explain the regulation of pre -natal diagnosis, determination of Sex prohibited.<br>• Discuss the precautions and procedure of recording, special circumstances, importance (section 32 & 157) of Indian Evidence Act).<br>• Describe the Prenatal Diagnostic Techniques Act 1994. | • Demonstrate the process of addressing discrepancies between personal values and difficult candidate situations.<br>• Demonstrate the process of taking consent.<br>• 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 26: Infection control policies and procedures and Bio-medical waste management

*Mapped to: HSS/N9618, V1.0*

**Terminal Outcomes:**

- Develop techniques of self-hygiene.
- Apply infection control policies and procedures during daily activities.
- Dispose different types of biomedical waste in appropriate colour coded bins/containers.
- Apply local guidelines of biomedical waste disposal system during daily activities.

| **Duration**: *15:00* | **Duration**: *15:00* |
|---|---|
| **Theory – Key Learning Outcomes** | **Practical – Key Learning Outcomes** |
| • Explain the concept of healthy living.<br>• Describe the importance of infection control and prevention.<br>• List strategies for preventing transmission of pathogenic organisms.<br>• Describe the nosocomial infections.<br>• Explain the importance of incident reporting.<br>• Explain the concept of immunization.<br>• Describe the hand-hygiene guidelines and procedures used in healthcare-settings.<br>• Explain the importance of using Personal Protective Equipment (PPE).<br>• List the types of PPE.<br>• Describe the process of wearing and removing each of the PPE.<br>• Explain various vaccinations against common infectious diseases.<br>• Categorize the different types of biomedical waste.<br>• Explain the importance and mechanism of proper and safe disposal, transportation, and treatment of bio-medical waste.<br>• Identify the various types of colour coded bins/containers used for disposal of biomedical waste.<br>• Explain the importance of following local guidelines of biomedical waste disposal. | • Demonstrate the steps of spill management.<br>• Demonstrate the procedures of hand hygiene.<br>• Demonstrate wearing, removing, and discarding of PPE.<br>• Segregate the biomedical waste applying the local guidelines.<br>• Create a chart depicting different types of biomedical waste and various types of color coded bins/containers used for disposal of biomedical waste.<br>• 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** | |
| Hypochlorite solution, chlorhexidine, alcohol swab<br>Apron, lab coat, gloves, mask, cap, shoes, safety goggles and spectacles, towels, cotton, isopropyl alcohol<br>Disposable cartridge and syringes<br>Spill Kit<br>Different coded color bins, chart for color coding of bins<br>Visit to biomedical waste treatment plant for field assignment | |

| | |
|---|---|
| **Mandatory Duration:** *<510:00>* | |
| **Module Name: On-the-Job Training**<br>**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 general 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 expectations 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.
- 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 extracting 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*** | |
| **Postgraduate (M. Sc)** | (M. Sc) in Life Sciences (Nursing, Dentistry, Pharmacy)<br>Or<br>M.Sc. in Medical Psychology<br>Or<br>M. Sc in Biotechnology<br>Or<br>M. Tech in Biotechnology | 5 | Experience working in hospitals with Genetics units | 4 | Working in hospital Genetics Units | |
| **Medical Graduate** | MBBS<br>Or<br>Medical Geneticists | 4 | Experience working in hospitals with Genetics units | 3 | Working in hospital Genetics Units | |

| Trainer Certification | |
|---|---|
| **Domain Certification** | **Platform Certification** |
| Certified for Job Role: "Genetic Counselor" mapped to QP: "HSS/Q8705 v1.0" with minimum score of 80%. | Recommended that the Trainer is certified for the Job Role: "Trainer", mapped to the Qualification Pack: "MEP/Q2601" with minimum score of 80%. |

| Assessor Prerequisites | | | | | | |
|---|---|---|---|---|---|---|
| **Minimum Educational Qualification** | **Specialization** | **Relevant Industry Experience** | | **Training/Assessment Experience** | | **Remarks** |
| | | ***Years*** | ***Specialization*** | ***Years*** | ***Specialization*** | |
| **Postgraduate (M. Sc)** | (M. Sc) in Life Sciences (Nursing, Dentistry, Pharmacy) Or M.Sc. in Medical Psychology Or M. Sc in Biotechnology Or M. Tech in Biotechnology | 7 | Experience working in hospitals with Genetics units | 5 | Working in hospital Genetics Units | |
| **Medical Graduate** | MD in medical genetics | 3 | Experience working in hospitals with Genetics units | 2 | Working in hospital Genetics Units | |

| Assessor Certification | |
|---|---|
| **Domain Certification** | **Platform Certification** |
| Certified for Job Role: "Genetic Counselor" mapped to QP: "HSS/Q8705 v1.0" with minimum score of 80%. | Recommended that the Trainer is certified for the Job Role: "Assessor", mapped to the Qualification Pack: "MEP/Q2701" 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 |