Bachelor of Science in Health and Hygiene

Introduction

The Bachelor of Science (Health and Hygiene) is designed to address broad spectrum of health-related issues within the industry, community, hospitals and health sector. The content covers up para-medical, administrative, financial, social, informational and occupational aspects around the modern healthcare standards. Studies will include, among others, courses in medical, biological, technological, legal, administrative and social foundations areas. The program provides the student with a wider perspective of modern healthcare system and associated health facilitates.

General Education Requirements

Candidate passed standard XII examination with Biology as one of the subjects are eligible for entry to this course. Fancy for the Biology, Concern for the sick and preparedness for emergency job are traits useful for the profession.

Course Objectives:

- Understand issues related to the present day healthcare system
- Acquire basic understanding of other healthcare systems
- Apply the principles of health administration, education and promotion of healthcare
- Analyze delivery of healthcare services, management, and human resources
- Understand principles of economics, marketing, planning and legal considerations within the healthcare system and organization
- Prepare for information processing and statistical analysis to generate data for the contextual needs of the healthcare planning
- Cultivate effective communication skills with adequate emphasis on the effective writing
- Impart medical expertise essential to assist medical treatment

Career Opportunities:

The successful graduate will be prepared for entry-level positions within a wide-range of health care area including:

- Healthcare industry
- Hospitals and allied health organizations
- Assist administering medical treatment
- Government for regulatory function
- Academia as educator in Health-care
- Marketing professional for business development
- Consultant and Evaluator in healthcare finance and Insurance
- Advisor for regulatory and legal issues
- Administrator in emergency health services
- Informatician for documentation of health data handling
- Technician for Clinical and medical research
- Administrator in Healthcare
- Planner to health policy makers
Prospective Employers:

Healthcare administration jobs are growing in a number of sectors, including:

- Healthcare facilities
- Diagnostic laboratories
- Food and drug laboratories
- Doctors’ offices
- Home care facilities
- Hospital networks
- Insurance companies
- Academic institutes
- Research establishments
- Pharmaceutical companies
- Government and municipal departments
- Forensic laboratories
- Medical counseling centers
- Emergency medical service

Professional Responsibilities

Science graduates in this course would get prepared to contribute and hold the following responsibilities:

- Increasing efficiencies and reduce overall all service cost
- Assist medical treatment and procedures
- Digitize medical records and processing
- Team up with medical professionals to strong inter-disciplinary group
- Compliance of latest regulations
- Assist decision making and policy framing process
- Respond in systematic to health care issues
- Express leadership skills within organizations
- Effectively plan and evaluate health care knowing culture and diversity
- Adapt to new technologies in health care sector
- Communicate effectively to clients, stakeholders with diverse background
- Address legal and ethical issues within health care system
- Bring specialized knowledge and skills in improvising health care services.
- Pursuit of excellence in the health care practice
Gujarat University  
Bachelor of Science in Health and Hygiene  
(Syllabus Proposed wef June 2014 at Government Science College, Ahmedabad)

SEMESTER I

HTH-101 Social Aspects of Health

Health Determinants and Standards  
Individual health parameters  
Determinants of Health, Key health indicators, Burden of diseases  
Importance and Source of Public-health Data  
Health status in India: Standards, Relevance to social aspects  
Future challenges in public health

Agencies  
Role of Public, Private and NGO in Health sector  
Expenditure in Health-care  
Government Plans and Policies in India  
UNITAID and Debt2Health finance schemes  
World Health Organization (WHO) and Centre for Disease Control and Prevention (CDC): Organization, Objectives and Role  
UN Millennium Development Goals

Community Health Concept  
Determinative factors: Family health history, Physique, Environment, Life-style and Social cultural aspects  
Overview of Healthcare Systems in India  
Primary healthcare hand-washing, immunization, circumcision  
Secondary healthcare draining puddles of water, clearing bushes and using insecticides  
Tertiary healthcare Hospital interventions intravenous rehydration and surgery  
Family planning programs: Contraceptives, Sexuality education promotion of safe sex, Pregnancy risk, infant health  
Other measures: Physical activities, Control of high-risk diseases, Tobacco usage

Occupational Health  
Risk factors for disease  
Diseases and occupational relevance  
Drugs, Tobacco and Alcohol: Chemical agents, Effects and Side effects

Reference  
**HTH-102 Practical**

1. Study of laboratory instruments
2. Determination of individual overall health level
3. Collection and interpretation of local data on diseases prevalence
4. Case study on recent disease outbreak
5. Demonstration of medically important entomological specimens
6. Preparation and examination of peripheral blood smear for Malarial parasite
7. Microscopic examination of Fungi

**SEMESTER II**

**HTH-103 Food and Nutrition**

**Human dietary requirements and deficiency diseases**
BMR (Basal Metabolic Rate), Daily nutritional requirements, Essential amino acids
Dietary requirements of food: Protein, Carbohydrate, Lipid, Micronutrients: Vitamins, Minerals and trace minerals.
Deficiency diseases (Malnutrition):
Types, Symptoms and Diagnosis of nutritional deficiencies:
Iron deficiencies (Anemia), Vitamin A deficiencies (Blindness), Vitamin B1 deficiencies (Beriberi), Vitamin B3 deficiencies (Pellagra), Vitamin B9 deficiencies (Serious birth defects), Vitamin D deficiencies (Osteoporosis), Calcium deficiencies (Osteoporosis, Convulsion)
Child malnutrition and remedial measures

**Food spoilage and Preservation**
Food Spoilage:
Types of spoilage
Genera features and composition of spoilage in milk, fruit, vegetables, grains, meat and fish
Natural flora and microflora after processing in milk, meat, fish, fruit, vegetables, grains
Food Preservation:
1) Traditional techniques: Refrigeration, freezing, drying, salt, sugar, smoking, lye, pickling, canning and bottling, jellying and juggling
2) Advanced technique: Pasteurization, artificial food additives, vacuum packing, irradiation, high pressure food preservation (Pascalization), bio-preservation, modified atmosphere, pulsed electric field electroporation

**Food poisoning and toxins**
Food poisoning:
Introduction, Organism involved, source of food contamination
Causes and symptoms in food poisoning by: *E.coli, Salmonella, Shigella, Staphylococcus aureus, Clostridium, Vibrio* and viral gastroenteritis
Control of Food poisoning
Toxins:
Food Intoxication
Fungal toxins: Aflatoxin and other Mycotoxins: Sources, Food affected, Chemical nature, Symptoms
Control measures
Bacterial toxins: Properties, Types and Chemical nature, effects
Analysis of food
Microbiological analysis of food:
Direct Microscopic examination of food,
Cultural techniques
Enumeration method:
Direct count by SPC (Standard plate count) and MPN (Most probable number) Count
Physico-chemical method by Dye reduction test, Electrical methods, ATP determination
Rapid methods for the detection of specific organisms and toxins by DNA / RNA
Hybridization method, ELISA, Sub-typing
Chemical Analysis: Physical Examinations, Detection of Adulteration of food

References:
2. Geofferey Campbell-Platt (Editor) (2009) Food Science and Technology, Willey and Blackwell Publication, UK.

HTH-104 Practical

1. Cultivation of microbes from spoilt food sample
2. Detection of adulteration in food
3. Physical examination of spoiled/contaminated food sample
4. Determination of reducing sugar by Cole’s method
5. Spectrophotometric estimation of protein by Folin’s method
6. Determine the saponification of lipid from food sample
7. Qualitative analysis of Proteins
8. Qualitative analysis of Carbohydrates
SEMESTER III

HTH-201   Human Anatomy

Body and Environmental Exchange
A. Human Body
   The Cell, Histology, Organs, Differentiation and Organizational levels
   Anatomical Positions and Planes of Human Body
   Integuments: The skin, Dermis, Hypodermis, Accessory structures Hair, Nails, Sweat glands, Sebaceous Glands
B. Environmental Exchange
   The Respiratory System Organs and Structures: Pharynx, Larynx, Trachea, Bronchial Tree
   Alveoli and The Lungs
   The Digestive System Organs and Structure: The Mouth, Pharynx, Esophagus, The Stomach, The Small and Large Intestines
   Accessory Organs: The Liver, Pancreas, and Gallbladder
   Kidney: General and Microscopic Anatomy
   Liquid Balance: Body Fluids and Compartments

Support and Movement
   Bone Tissue and the Skeletal System: Functions of the Skeletal System, Bone Classification
   Axial Skeleton: The Skull, The Vertebral Column, The Thoracic Cage
   The Appendicular Skeleton: The Pectoral Girdle, Bones of the Upper Limb, The Pelvic Girdle and Pelvis, Bones of the Lower Limb
   Joints: Fibrous, Cartilaginous and Synovial Joints,
   Muscular System: Skeletal Muscle, Types of Muscle Fibers, Cardiac and Smooth Muscle,
   Naming Skeletal Muscles
   Axial Muscles: Head, Neck, Back, Abdominal Wall, Thorax, Pectoral Girdle and Upper-lower Limbs

Control and Integration
   The Nervous Tissue and System: Basic Structure and Function, Nervous Tissue
   Anatomy of the Nervous System: The Central Nervous System, the Central and peripheral Nervous Systems

Fluids Transport and Human Development
A. The Circulatory System
   Blood, Erythrocytes, Leukocytes and Platelets
   Heart: Heart Anatomy
   Blood Vessels and Circulation: Structure and Function of Blood Vessels
   The Anatomy of Lymphatic system
B. Human Development
   The Reproductive System: Anatomy of the Male and Female Reproductive System
   Development: Embryonic development, Fetal development, Labor and Birth
References
1. Bruce Forciea (2012) An eText of Human Anatomy and Physiology, Creative Commons Attribution
4. Tortora Gerald J and Bryan Derrickson (2014) Anatomy and Physiology, India Edn, Wiley India

HTH-202 Pharmacy Science

Drugs and Systems of Medicine
Concepts and Practices in Ayurveda, Homoeopathy, Unani, Naturopathy and Electropathy Systems
Drug: History, Sources and Active Principle
Drug dosage administration: Oral, Nasal, Parenteral, Pulmonary, Rectal, Vaginal, Cutaneous, Inhalation and Dermatologic
Cellular Sites of Action, Potential Targets of Drug Action, Distribution barriers and Drug-Receptor Interaction

Basic Pharmacy
Prescription, Content and types
Contra-indications and Determination of Dosage
Information on dispensed medicines
Types of medicines preparation and packaging
Indian and US Pharmacopeia

Systems Pharmacology

Drugs, Alcohol and Tobacco
Psychotropic Drugs: types Stimulants, Club drugs, Depressant and other Effects, Dependence and Withdrawal symptoms
Tobacco: harmful effects, Benefits of quitting, Means to control Alcohol: Effects over body, behavior and other effects Alcoholic beverages content and its metabolism Tests for detection and Control measures

References:

**HTH-203 Practical**

1. Study of Body Systems: Control and Integration
2. Study of Body Systems: Environmental Exchange
3. Study of Body Systems: Fluids Transport and Human Development
4. Study of Body Systems: Support and Movement
5. Estimation of Nicotine / Alcohol / Drug from the given sample
6. Extracting information from Pharmacopeia
7. Sterility testing of pharmaceutical products.
8. Study of Labelling over Pharmaceutical product

**SEMESTER IV**

**HTH-204 Human Physiology**

**Body and Environmental Exchange**
Catabolism and Anabolism, ATP formation, Membrane transport
Chemical Digestion and Absorption, Homeostasis, Thermal regulation
Functions of Integuments
The Urinary System: Characteristics and Formation of Urine, Glomerular Filtration and Clearance, Tubular Reabsorption, Renal Blood Flow and Urine Transport, Regulation of function
Liquid Balance: Balance of Water, Electrolyte and pH

**Support and Movement**
Bone Tissue and the Skeletal System: Structure, Formation, and Repair of fracture
Joints: Types of joints Movements
Muscular System: Contraction and Relaxation, Nervous Control of Muscle Tension

**Control and Integration**
The Nervous Tissue and System: Resting and Action Potentials, Communication between Neurons, Artificial stimulation of nerves cells
The Brain and Cranial Nerves: Central Processing, Motor Responses, Autonomic Reflexes
Sensory perceptions: Vision, Taste, Smell, Balance, Voice and Speech, Pain Learning, Memory, and Sleep

**Fluids Transport and Human Development**
A. The Circulatory System
Heart: Cardiac Muscle and Electrical Activity, Cardiac Cycle
The function of Lymphatic system
B. Human Development
Development: Fertilization, Maternal changes during pregnancy, Lactation
Inheritance: Mendelian laws of inheritance, Nature of Genetic code

References
1. Bruce Forciea (2012) An eText of Human Anatomy and Physiology, Creative Commons Attribution
4. Tortora Gerald J and Bryan Derrickson (2014) Anatomy and Physiology, India Edn, Wiley India

HTH-205 Clinical Research

Clinical Research
Drug development and Clinical Trials
Response Variables and Biomarkers, Risk identification and Informed consent
Clinical Trial Phases I to V
Planning and design of Clinical study
Concept of Bioavailability and Bioequivalence, PK/PD Modelling
Clinical Research Operations Management

Clinical Reports
Clinical study reports and its structure
Guidelines for Reporting, Publication Bias, Suppression, Delays and Conflicts of Interest
Clinical Data Management and Biostatistics: Study Population, Sample size, Baseline, Issues in data analysis
Tools and Software used in Clinical studies

Regulations
Regulations in Clinical Research, Drug Accountability, Financial Disclosure
Ethical issues, the Belmont Report, Conflict of Interest
Politics of Research: Women, Religion, Race, Gender, Developing Countries
Current regulatory requirements and overview for New Drug Application, Abbreviated NDA, Investigational New Drugs
Agencies for drug approval in India

Case studies
Study of Sample case studies

References

**HTH-206  Practical**

1. Microscopic examination of normal histological specimen
2. Diagnosis of Diabetes by Sugar analysis
3. Measurement of Body temperature, Heart-beats, Pulse rates and Blood pressure
4. Measurement of respiratory function
5. Physical, Chemical and Microscopic analysis of urine
6. Study of Basic Metabolic Rate (BMR)
7. Drawing conclusion from clinical data using statistical tools
8. Study of Bioequivalence profile from sample data