

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 facilities.

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
The Global Health Council, The Global Network for Neglected Tropical Diseases, The Global Alliance for TB Drug Development, The International AIDS Vaccine Initiative, Malaria Vaccine Initiative
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

1. Gordon Edlin and Eric Golanty (2010) Health & Wellness (10th Edn) Jones & Barlett Publisher.
2. Skolnik Richard (2012) Global Health 101 (2nd Edn, Riegelman Richard Ed.) Jones & Barlett Learning
3. Mary-Jane Schneider (2014) Introduction to Public Health (4th Edn,) Jones & Barlett

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

General 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, jelling 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:

1. Adams MR and Moss MO (2008) Food Microbiology (3rd Edition) RSC publications, UK.
2. Geofferey Campbell-Platt (Editor) (2009) Food Science and Technology, Willey and Blackwell Publication, UK.
3. Lightfoot NF and Maier EA (Editor) (2003) Microbiological analysis of food and water, Elsevier Publication, Netherland.
4. Ray B and Bhunia A (2008) Fundamental food Microbiology (4th Edition) CRC 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

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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

The Endocrine Glands: An Overview, The Pituitary Gland, Hypothalamus, The Thyroid

Gland, The Parathyroid Glands, The Adrenal Glands, The Pineal Gland, Gonadal and

Placental Hormones, The Endocrine Pancreas, Organs with Secondary Endocrine Functions

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
2. OpenStax College (2013) Anatomy & Physiology, Rice University, MS, ISBN 978-1-938168-13-0
3. Vishram Singh (2008) General Anatomy, Elsevier, New Delhi
4. Tortora Gerald J and Bryan Derrickson (2014) Anatomy and Physiology, India Edn, Wiley India
5. David Shier, David N Shier, Jackie Butler, Jackie L Butler, Ricki Lewis (2013) Hole's Human Anatomy & Physiology (13th Edn) McGraw-Hill

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 action: Drug Acting on the Nervous System, Biogenic Amines, Vasodilators, Inhibitors of the RAA System, Acting on Smooth Muscle, Cardiac Drugs, Antianemics, Antithrombotics, Plasma Volume Expanders, Drugs used in Hyperlipoproteinemias, Diuretics, Drugs for the Treatment of Peptic Ulcers, Laxatives, Antidiarrheals, Other Gastrointestinal Drugs, Acting on Motor Systems, Analgesics, Antipyretic and Antiinflammatory Drugs, Local Anesthetics, Opioids, Anesthetics, Hypnotics, Psychopharmacologicals, Hormones, Antibacterial, Antifungal, Antiviral, Disinfectants and Antiseptics, Antiparasitic, Antimalarials, Anticancer, Immune Modulators and Antidotes

Pharmacokinetics: Drug concentration a function of time, First-order, Time course of drug concentration in plasma, Drug levels during repeated dosing or irregular intake, Accumulation, Alteration in elimination characteristics

Pharmacodynamics of Drug Elimination: Liver, Biotransformation, Enterohepatic Cycle, Renal excretion, Molecular interaction

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:

1. Gordon Edlin and Eric Golanty (2010) Health & Wellness (10th Edn) Jones &Barlett Publisher.

2. Rees Judith A, I Smith and J Watson (2014) Pharmaceutical Practice (5th Edn) Churchill Livingston Elsevier
3. Heinz Lüllmann, Klaus Mohr, Albrecht Ziegler, Detlef Bieger (2000) Color Atlas of
4. Pharmacology, (2nd Edn), Thieme Stuttgart, New York
5. Ministry of Health and Family Welfare (1996) Indian Pharmacopeia, Vol 1 and 2, Controller of Publications, Delhi

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 Respiratory System: The Process of Breathing, Exchange and Transport of Gases, Lung Volume and Capacities

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

The Endocrine Functions: Hormones, The Pituitary Gland, Hypothalamus, The Thyroid Gland, The Parathyroid Glands, The Adrenal Glands, The Pineal Gland, Gonadal and

Placental Hormones, The Endocrine Pancreas, Organs with Secondary Endocrine Functions

Fluids Transport and Human Development

A. The Circulatory System

Heart: Cardiac Muscle and Electrical Activity, Cardiac Cycle

Blood Vessels and Circulation: Blood Flow, Pressure and Resistance, Capillary Exchange, Circulatory Pathways, Hemostasis, Fibrinolysis and Thromboprotection.

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
2. OpenStax College (2013) Anatomy & Physiology, Rice University, MS, ISBN 978-1-938168-13-0
3. Elden D Enger, FC Ross and DB Bailey (2005) Concepts in Biology, (11thEdn), TMH
4. Tortora Gerald J and Bryan Derrickson (2014) Anatomy and Physiology, India Edn, Wiley India
5. Hall John E (2013) Guyton and Hall Textbook of Medical Physiology, (South Asian Edn), Elsevier India
6. David Shier, David N Shier, Jackie Butler, Jackie L Butler, Ricki Lewis (2013) Hole's Human Anatomy & Physiology (13th Edn) McGraw-Hill

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

1. Lawrence M. Friedman, Curt D. Furberg and David L. DeMets (2010) Fundamentals of Clinical Trials, Springer ISBN: 978-1-4419-1585-6 (Print) 978-1-4419-1586-3 (Online)
2. World Health Organization (2005) Handbook for good clinical research practice (GCP) : guidance for implementation. ISBN 92 4 159392 X
3. Judy Stone (2006) Conducting Clinical Research: A Practical guide for Physicians, Nurses, Study Coordinators and Investigators. (1st Edn), Mountainside MD Press, Maryland, ISBN 097491780X

4. Spilker Bert (1984) Guide to Clinical Trials, Raven Press, Norris, MT
5. UK Clinical Research Collaboration (2006), Understanding Clinical Trials (Eds. Janet Darbyshire et al), Medical Research Council and National Institute for Health Research, London

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