Srimanta Sankardeva University of Health Sciences

Bhangagarh, Guwahati, Assam

Courses of Study and Curriculum

(As per SSUHS B. Sc. in Medical Technology Regulation, 2022)

With Effect from

Academic Year 2022 – 23.

FIRST YEAR COMMON SUBJECTS

First Semester

Subject Code	Subjects	Contact Hours / Week			
		Theory	Practical	Clinical	Total
MT1C111	Human Anatomy - I	3	2	--	5
MT1C112	Human Physiology – I	3	2	--	5
MT1C113	Basic Biochemistry	3	3	--	6
MT1C114	Hospital Duty and Patient Care - I	2	--	6	8
MT1C115	Computer Applications	2	2	--	4
MT1C116	Communication Skills	2	--	--	2
	Total	15	09	06	30

Second Semester

Subject Code	Subjects	Contact Hours			
		Theory	Practical	Clinical	Total
MT1C121	Human Anatomy - II	3	3	--	6
MT1C122	Human Physiology – II	3	--	--	3
MT1C123	Basic Microbiology	3	3	--	6
MT1C124	Hospital Duty and Patient Care - II	2	--	6	8
MT1C125	Health education & community health	2	--	3	5
MT1C126	Environmental Science & Bio-waste Management	2	--	--	2
	Total	15	06	09	30

Scheme of Clinical Training during the Course:

The clinical component has been designed to complement the academic program and runs throughout the course. The clinical posting has been designed so that the students will be able to observe the practical application of the academic course wherever possible.

First Semester:

Introduction to the Hospital Setting (the students shall be posted to a multi-speciality hospital will all major departments) (6 hours per week):

i. For the students to become familiar with some of the practical applications of the academic course.
ii. To introduce the wider hospital setting.
iii. To help the students to identify the various disciplines within a hospital, their role and the importance of cooperation.
iv. To introduce patients in a clinical setting and to begin to acquire basic communication skills.

Second Semester:

Introduction to hospital operation and management (6 hours per week):

i. For the students to become familiar with some of the management of a hospital and its' departments.
ii. To introduce students to the general operations and management of wider hospital.
iii. To get basic idea about patient care and basic nursing skills.

Introduction to the Community Health Services (3 hours per week):

i. For the students to become familiar with community health.
ii. To introduce students with the community health education.
iii. To make students familiar with mass communication.
iv. To become familiar with community health issues and its solutions.

Third Semester to Sixth Semester:

Skills related to working in the respective departments. Students shall be posted in the respective departments of their courses of study.

i. To familiarize the students with the different units within the department and the procedures carried out in each unit.
ii. To enable the student to recognize and relate to the basic terminology introduced in the academic program.
iii. To establish a sense of identity within the student group and to understand the role of the technology in the management of various cases.
iv. To introduce the students to the staff of the department.
v. To help the student to understand team roles.
vi. To familiarize the students with written QA programs within the department.
vii. To become competent in the use and handling of the equipment.
viii. To communicate effectively with patients.

ix. To integrate into the department as part in specific and multidisciplinary teams.

x. To empathize with patients and to appreciate their own feelings in the clinical situation.

xi. To handle and achieve proficiency in mould room techniques.

xii. To identify the functions of various equipment and safe handling.

xiii. To identify the functions on a control panel, indicating their purpose and safely using these when appropriate.

xiv. To learn safe use of the accessory equipment in the correct context.

xv. To be able to anticipate the physical and psychological needs of the patient and respond to them.

Rotation posting:

Students shall be posted to other relevant departments or other centers (if necessary) with better and latest equipment's for a minimum period of 1 month in the sixth semester of their study for completion of training in recent advances in the specialty. The student on completion of the training shall submit a report duly signed by the concerned department to the HOD.

Log Book:

Each student shall maintain a Log Book for their clinical posting from first semester to sixth semester. During each day of clinical posting, the log book shall be duly verified and signed by the concerned supervisor. At the end of each semester, the log book shall be verified and duly signed by the Head of the Department of the Academic program.

Internship:

After successfully passing all the Academic Semesters of the Course, each student shall undergo six months Compulsory Rotational Internship Program (CRIP). Students shall be deputed to the department(s) and/or subspecialities relevant to their courses of study wherein they shall be provided with hand on training of professional practice to develop clinical skillset in the respective areas of paramedical sciences. Each Intern shall be allotted with a clinical supervisor from the respective department(s) only. None of the Inter shall be allowed to work independently without allotment of Supervisor. Each student is required to maintain a Log-Book of the various posting. The responsibility of safe custody of the Log-Book rests on the Intern. An objective evaluation of his knowledge, skill, attitude and ethics during the Compulsory Rotational Internship Program (CRIP) shall be recorded by the Supervisor using a score of 0 to 10, for scoring (where, 0 stands for unsatisfactory and 10 stands for highest satisfaction level). After successful completion of CRIP, duly filled Log-Book to be submitted to the University through the Principal of the College.

Students shall be on internship duty for 8 hours each day covering 180 days period. There shall be 1 (one) day weekly rest and maximum 7 (seven) days leave admissible to the Interns.

SYLLABUS

FIRST SEMESTER

COMMON FOR ALL B. SC. MEDICAL TECHNOLOGY

MT1C111 Human Anatomy – I 3 hours per week

Unit – I

Terminology and general plan of the body, body parts and areas. Terms of location and position. Body cavities and their membranes, dorsal cavity, ventral cavity. Planes and sections.

Glands - classification, describe serous, mucous & mixed glands with examples.

Unit – II

Cells - Structure, function and location, prokaryotic and eukaryotic cells, Cell organelles, Cell division.

Tissue - types, structure, location and function of epithelial tissue, connective tissue, muscle tissue, nerve tissue, membranes, glandular tissue.

Integumentary system - structure and function of the skin, subcutaneous tissue.

Unit – III

Musculoskeletal System: Basic anatomy of important muscles and bones, superior extremity, inferior extremity, bones and skull, head and neck, thorax and abdomen, side determination, General features and some important muscle attachments.

Unit-IV

Respiratory system: Basic anatomy of nose, larynx, trachea, bronchi and lungs

Unit – V

Digestive system: basic anatomy of oesophagus, stomach, small intestine, large intestine, liver, gall bladder, pancreas

Human Anatomy-I (Practical) 3 hours per week

1. Demonstration of major organs through models and permanent slides.
2. Demonstration of parts of circulatory system from models.
3. Demonstration of parts of respiratory system from models.
4. Demonstration of digestive system from models.
5. Structure of eye and ear
6. Demonstration of structural differences between skeletal, smooth and cardiac muscles.
7. Demonstration of various bones
8. Demonstration of various joints

(This is not an exhaustive list of practical topics. Topics may be included by the HODs of the concerned department as required based on the Theory syllabus.)

MT1C112 Human Physiology – I 3 hours per week

Unit – I

General Physiology: Organization of human body, tissues of the body; transport across cell membrane; Homeostasis, Body Fluid compartment & measurement.

Unit – II

Blood: composition, function, cellular component & their function, haemoglobin & anaemia, blood groups and coagulation

Lymphatic system - Composition & function of lymph, lymphatic tissue, Immunity with the role of thymus

Unit - III

Cardiovascular system: general arrangement, heart, arteries, veins and capillaries, heart structure and function, cardiac cycle, heart sounds, heart rate, blood pressure, mechanism of circulation, hypertension & shock

Unit - IV

Respiratory system: parts of respiratory system, mechanism of respiration, pulmonary function, pulmonary circulation, lungs volume. Gas transport between lungs and tissues. Basics of hypoxia, dyspnoea, cyanosis, asphyxia and obstructive airways diseases

Unit- V

Gastrointestinal physiology: Organs of GIT and their structure & function, secretion, digestion, absorption and assimilation. Gastrointestinal hormones. Physiology of digestion of carbohydrates, proteins & lipids. Structure & function of liver, spleen, gall bladder & pancreas.

Human Physiology-I (Practical) **3 hours per week**

1. Measurement of pulse rate
2. Measurement of blood pressure
3. Determination of vital capacity, spirometer.
4. Determination of clotting time & bleeding time
5. Demonstration of ECG
6. Estimation of Haemoglobin by Sahli's Method
7. Estimation of Haemoglobin by CMG method.
8. Estimation of Total RBC count.
9. Estimation of total leucocyte count.
10. Estimation of differential leucocyte count.
11. Estimation of PCV
12. Calculation of Red Cell Indices.
13. EMG.

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MT1C113 Basic Biochemistry 3 hours per week

Unit – I

Carbohydrate chemistry – Definition, classification of carbohydrates, examples. Glycolysis, gluconeogenesis, citric acid cycle, energetics, blood glucose regulation,

Unit - II

Lipid chemistry - Definition of lipids, functions of lipids in the body. Classification of lipids with examples. Definition and classification of fatty acids. Essential fatty acids. Phospholipids and their importance

Unit – II

Amino acid and Protein chemistry - Definition and Classification of amino acids with examples. General structure of D and L amino acids. Peptides - definition & biologically important peptides. Classification of Proteins based on composition, functions and shape with examples. Functions of amino acids and Proteins.

Unit – IV

Nucleotide and Nucleic acid chemistry – Definition, classification of nucleic acid. Composition & functions of DNA & RNA. Structure of DNA (Watson and Crick model). Structure of tRNA, & functions of tRNA, rRNA, mRNA

Unit – V

Enzymes - Definition and classification of enzymes with example. Active site, cofactor, proenzyme.

Unit – VI

Vitamins - Definition and classification, biochemical functions and disorders of vitamins.
Minerals – Calcium, potassium, sodium, phosphorus, molybdenum, iron, magnesium, copper, selenium etc.

Unit – VII

Nutrition - Balanced diet, Caloric values of carbohydrates, proteins and fats. Total daily caloric requirements of an adult male and female. RDA (Definition, standard values for nutrients). Basal metabolic rate (BMR), factors affecting BMR. Thermic effect/ SDA of food.

Unit – VII

Acid-Base, Buffers - Basic idea of acids, bases, pH, buffer, Acid base balance

Basic Biochemistry (Practical) 2 hours per week

1. Introduction to different apparatus and equipment used in biochemistry laboratory
2. Demonstration of Colorimeter, spectrophotometers, biochemical analyzers.
3. Identification tests for different types carbohydrates.
4. Identification tests for lipids & fatty acids.
5. Identification tests for proteins.
6. Estimation of blood glucose
7. Estimation of Urea

(This is not an exhaustive list of practical topics. Topics may be included by the HODs of the concerned department as required based on the Theory syllabus.)

MT1C114 Hospital Duty and Patient Care 2 hours per week

Unit – I

Introduction to Hospital: History of hospital, classification of hospital, departments in hospital, responsibilities of a hospital.

Unit – II

Records and Reports: Types of records and reports, value of record, care of record, objective of maintaining report, medical records, difference between records and reports.

Unit – III

Negligence: Definition, types of professional negligence

Unit – IV

Care of Patient: Maintenance of therapeutic environment, Safety factors for patients, comfort measures for patient, communication.

Unit – V

Vital Signs –

- Blood Pressure: Normal and abnormal values, Measurement procedure for blood pressure, Hypotension and hypertension
- Pulse Rate: Normal and abnormal pulse, Sites of pulse sensation
- Respiratory Rate: Factors influencing respiratory rate, Normal and abnormal respiration
- Temperature: Sites for temperature measurement, Pyrexia, Types and phases of fever
- General instructions regarding measurement of temperature, pulse, blood pressure and respiratory rate

Unit – VI:

Medical Ethics: Principles of medical ethics, patient rights, confidentiality, informed consent, code of conduct, etiquettes, professional misconducts.

MT1C115 Computer Applications 2 hours per week

Unit – I

Introduction to Computer – History of computer, architecture of computer system, computer memory, input and output devices, interaction between User and Computer, introduction to Software, Computer Virus, Types of Viruses, Use of Antivirus software

Unit – II

- Basics of Operating System - Definition of Operating System, objectives, types, and functions of Operating Systems.
- Windows Operating System - Introduction, The Desktop, Structure of Windows, Windows Explorer, File and Folder, Operations, The Search, The Recycle Bin, Configuring the Screen, Adding or Removing New Programs using Control Panel, Applications in windows (Paint, Notepad, WordPad, Calculator).

Unit – III

Introduction to Communication Tools –

- MS-Word: Introduction, starting MS-Word, MS-Word screen and its components, elementary working with MS-Word.
- MS-Excel: Introduction, starting MS-Excel, basics of Spreadsheet, MS-Excel screen and its components, elementary working with MS-Excel.
- MS-PowerPoint - Introduction, starting MS-PowerPoint, basics of PowerPoint, MS-PowerPoint screen and its components, elementary working with MS-PowerPoint.

Unit – IV

Internet and Internet application - Introduction, Internet evolution, working of Internet, use of Internet, overview of World Wide Web (Web Server and Client), introduction to Search engine and Searching the Web, downloading files, introduction to Web Browsers, working with E-mail.

Unit – V

Bio-informatics - Introduction, objective of bio-informatics, bio-informatics databases, concept of bio-informatics, Impact of bio-informatics in healthcare system.

Unit – VI

Application of Computers in health system – Introduction to the applications of computer in healthcare system, maintaining patient record, patient monitoring, Telemedicine, Health Informatics.

Computer Applications (Practical) 2 hours per week

1. Demonstration of computer hardware.
2. Basics of computer application.
3. Introduction to latest Windows operating system.
4. Introduction to MS Word and its application.
5. Introduction to MS Excel and its application
6. Introduction to MS PowerPoint and its application
7. Creation of email and sending emails.
8. Any other practices according to the theory.

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MT1C116 Communication Skills 2 hours per week

Unit – I

- Communication Skills - Introduction, definition, importance of communication.
- Communication process - source, message, encoding, channel, decoding, receiver, feedback, context
- Barriers to communication - physiological barriers, physical barriers, cultural barriers, language barriers, gender barriers, interpersonal barriers, psychological barriers, emotional barriers
- Perspectives in communication - introduction, visual perception, language, other factors affecting our perspective, past experiences, prejudices, feelings, environment

Unit – II

- Elements of communication - introduction, face to face communication – tone of voice, body language (non-verbal communication), verbal communication physical communication.
- Communication styles: introduction, the communication styles matrix with example for each - direct communication style, spirited communication style, Systematic Communication style, considerate communication style.

Unit – III

- Basic listening skills - introduction, self-awareness, active listening, becoming an active listener, listening in difficult situations.
- Effective written communication: introduction, when and when not to use written communication - complexity of the topic, amount of discussion required, shades of meaning, formal communication.
- Writing effectively - subject lines, put the main point first, know your audience, organization of the message

Unit – IV

- Interview skills - purpose of an interview, dos and donts of an interview giving presentations: dealing with fears, planning your presentation, structuring your presentation, delivering your presentation, techniques of delivery

Unit – V

Group discussion: introduction, communication skills in group discussion, dos and donts of group discussion.

SYLLABUS

SECOND SEMESTER

COMMON FOR ALL B. SC. MEDICAL TECHNOLOGY

MT1C121 Human Anatomy – II 3 hours per week

Unit – I

Cardiovascular system: Basic anatomy of heart and important blood vessels Brief introduction about Lymphatic System

Unit –II

The Nervous System: Basic anatomy of brain and spinal cord, meninges and cerebrospinal fluid, Cranial Nerves

Unit-III

Endocrine System: Brief anatomy of Pituitary, Thyroid, Parathyroid, Pancreas, Adrenal

Unit-IV

Special Senses: Basic anatomy of eye, ear and nose.

Unit-V

Genitourinary system: Basic anatomy of kidney and associated organs, male reproductive organs, female reproductive organs

Human Anatomy – II (Practical) 3 hours per week

1. Demonstration of heart and vessels in the body
2. Histology of large artery & vein, medium sized artery & vein
3. Histology of thin and thick skin
4. Demonstration and histology of eyeball
5. Histology of cornea & retina
6. Demonstration of nervous system
7. Demonstration and histology of kidney
8. Demonstration of male & female reproductive system

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MT1C122 Human Physiology – II 3 hours per week

Unit – I

Organs of Excretory System: Kidneys, Nephron, Mechanism of Excretion, Urine formation (Glomerular filtration and Tubular reabsorption), Electrolytes: their balances and imbalances Introduction of acidosis and alkalosis

Unit – II

Muscle nerve physiology, types of muscles, their gross structural and functional difference with reference to properties.

Unit – III

Nervous system- general organization of CNS, function of important structure and spinal cord, neuron, nerve impulse, type of nerves according to function, Autonomic nervous system- organization & function, Special senses-general organization & functions

Unit – IV

Endocrine System: Brief introduction about endocrine glands and their secretion, common endocrinological disorder such as diabetes mellitus, hyper & hypothyroidism, dwarfism, gigantism, tetany.

Unit – V

Reproductive System: male & female reproductive organs, sex hormones, secondary sexual characteristics, puberty, spermatogenesis, oogenesis, menstrual cycle, pregnancy, menopause, contraceptive measures.

MT1C123 Basic Microbiology 3 hours per week

Unit – I

Introduction: History and scope of microbiology; classification and morphology of bacteria; introduction to microscope, types of microscopes and their usage.

Unit – II

Growth and Nutrition: Nutrition, growth and multiplication of bacteria, bacterial growth curve, culture media, culture methods, anaerobic culture methods.

Unit – III

Sterilization and disinfection: Principles and use of equipment of sterilization, chemicals used in disinfection, testing of disinfectants.

Unit – IV

Systematic bacteriology: Introduction, disease caused and laboratory diagnosis of medically important bacteria (*Staphylococcus, coagulase negative Staphylococcus, MRSA, Streptococcus pyogenes, Pneumococcus, gonococcus, E.coli, diarrhoeagenic E.coli, Salmonella, Vibrio cholerae, ElTor vibrios, Halophilic vibrios, Shigella, Mycobacterium tuberculosis, Mycobacterium leprae, Atypical Mycobacteria, Treponema pallidum, leptospira*)

Unit – V

Parasitology: Introduction to Parasitology, List of medically important parasites and diseases (*E.histolytica, Plasmodium, W.bancrofti, Ascaris, Ancylostoma, B.coli, G.lamblia, T.solium, T.saginata*)

Unit – VI

Virology: Introduction to virology. List of medically important viruses and diseases (AIDS, Hepatitis, Rabies, Polio, Arbo viruses)

Unit – VII

Mycology: Introduction to Mycology, Classification of medically important fungi - (based on morphology, spore production, disease production, taxonomy), List of medically important fungi and diseases (Candidiasis, Cryptococcosis, Dermatophytes, Aspergillosis, Mucor Mycosis)

Basic Microbiology (Practical) 3 hours per week

1. Introduction to basic and advanced apparatus and equipment in microbiology laboratory.
2. Demonstration of Compound microscope and techniques of microscopy.
3. Demonstration of different types of sterilization equipment.
4. Demonstration of culture media and culture methods
5. Preparation of common culture media and incubation of common microorganisms.
6. Demonstration of antibiotic sensitivity testing
7. Demonstration of Gram stain and ZN staining
8. Gram stain, Acid fast staining

(This is not an exhaustive list of practical topics. Topics may be included by the HODs of the concerned department as required based on the Theory syllabus.)

MT1C114 Hospital Duty and Patient Care - II 2 hours per week

Unit – I:
First Aid: Aim of first aid, Golden rules of first aid, Qualities and responsibilities of a first aider. First aid measure of Poisoning, Snake bite, Dog bite, Scorpion bite, Food poisoning, Bleeding or hemorrhage, Burns and scalds, Cardiac arrest

Unit – II
Shock - Definition, types of shock, causes, effects, signs and symptoms of shock, management of shock

Unit – III

- Burns: Degree of burns, management of burns, dressing,
- Wounds: Types of wounds, management of wounds, wound dressings.
- Poisoning: Sources of poisoning, signs and symptoms of poisoning, management of poisoning.
- Bedsores: Types of bedsores, signs and symptoms, common sites of bedsores, treatment

Unit – IV
Artificial Ventilation: Types of artificial ventilation, procedure

Unit – V
Infection: Sources of infection, infectious agents, modes of transmission, stages of infection, hospital borne infections

Unit – VI
Drugs: Definition, classification of drugs, effects of drugs in body, routes of drug administration.

MT1C125 Health education & community health 2 hours per week

Unit – I

Concept of health: Definition of physical health, mental health, social health, spiritual health determinants of health, indicators of health, concept of disease, natural history of diseases, the disease agents, concept of prevention of diseases.

Unit – II

- Health education: Principles & objectives, levels of health education, educational methods, evaluation & practice of health education in India.
- Health counseling: Introduction, theories, process & techniques.

Unit – III

Demography and family planning: Demography cycle, fertility, family planning, contraceptive methods, behavioral methods, natural family planning methods, chemical methods, mechanical methods, hormonal contraceptives, population problem of India.

Unit – VI

- Epidemiology: Its scope, methods, uses, dynamics of disease transmission.
- Immunity and immunization: Immunological products and their dose schedule.
- Principles of disease control and prevention, hospital acquired infection, prevention and control. Disinfection, types of disinfection procedures for - urine, sputum, room linen, dead-bodies, instruments.

Unit – V

National Health Programmes:

- National Health Mission (NHM),
- Reproductive and Child Health Programme (RCH),
- National Vector Borne Diseases Control Programme (NVBDCP),
- Revised National TB Control Programme (RNTCP),
- National Leprosy Eradication Programme (NLEP),
- National Aids Control Programme (NACP),
- National STD Control Programme,
- National Cancer Control Programme,
- National Mental Health Programme,
- Tobacco Control Activities,
- Drug - Deaddiction Programme,
- National Blindness Control Programme,
- National Diabetes, Cardio-vascular and Stroke Programme,
- Trauma and Injuries Prevention and Management Activities etc.

MT1C126 Environmental Science and Bio-waste management — 2 hours per week

Unit – I

- Natural Resources: Introduction, multi-disciplinary nature of environmental studies, earth resources and man, renewable and non-renewable resources, water resources, mineral resources: food resources: effect of modern agriculture, fertilizer/pesticide problems, water logging, salinity, energy resources.
- Ecosystems: Concept of an ecosystem, structure and functions of an ecosystem, producers, consumers and decomposers, cycles in the ecosystem
- Biodiversity: Introduction, definition: genetic, species, ecosystem diversity, India as a mega diversity nation, hotspots of biodiversity threats to biodiversity. poaching of wildlife, man-wildlife conflicts, endangered and endemic species of India, conservation of biodiversity

Unit – II:

- Pollution: Definition, causes, effects and control measures of air pollution, water pollution, pollution, marine pollution, noise pollution, thermal pollution, nuclear hazards, solid waste management role of individuals in pollution prevention.
- Population and Environment: From unsustainable to sustainable development, urban problems related to energy, water conservation, rain water harvesting, global warming, acid rain, ozone layer depletion, nuclear accidents and nuclear holocaust. environment protection act.

Unit – III

- Environment & health: Definition & components (environment sanitation environmental sanitation)
- Water: Safe & wholesome water requirements, uses, source of water supply (sanitary well)-purification of water, large scale purification, small scale purification – water quality – special treatment of water.

Unit – IV

Bio-medical waste (BMW): Concepts and perceptions, waste generation, segregation, disposal, planning and objectives of BMW management, survey, policies and perspectives of BMW management, record keeping, management of bio-medical waste, technologies for treatment for BMW, criteria for selecting appropriate medical waste management technologies.

Unit – V

Legal aspects and environment concern, implementation of action plan, approaches to common regional facility