

**MRSPTU (B. SC. RADIO MEDICAL IMAGING TECHNOLOGY) SYLLABUS  
BATCH 2020 ONWARDS**

<b>SEMESTER 1<sup>st</sup></b>		<b>Contact Hrs.</b>			<b>Marks</b>			<b>Credits</b>
<b>Subject Code</b>	<b>Subject Name</b>	<b>L</b>	<b>T</b>	<b>P</b>	<b>Int.</b>	<b>Ext.</b>	<b>Total</b>	
BRMIS1-101	Human Anatomy & Physiology-I	3	1	0	40	60	100	4
BRMIS1-102	Applied Biochemistry	3	1	0	40	60	100	4
BRMIS1-103	Communication Skills	3	1	0	40	60	100	4
BRMIS1-104	Human Anatomy & Physiology Lab	0	0	4	60	40	100	2
BRMIS1-105	Applied Biochemistry Lab.	0	0	4	60	40	100	2
BRMIS1-106	Communication Skills-Lab	0	0	4	60	40	100	2
BRMIS1-107	Drug Abuse: Problem, Management and Prevention	3	0	0	40	60	100	3
<b>Total</b>		-	-	-	340	360	700	21

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**HUMAN ANATOMY & PHSIOLOGY-I**

**Subject Code: BRMIS1 -101**

**L T P C**

**Duration: 60 (Hrs.)**

**3 1 0 4**

**Course Objectives:**

- Students will be able to learn the terminology of the subject and basic knowledge of cells, tissues, blood and to understand anatomy and physiology of human body.

**Course Outcomes:**

- Demonstrate knowledge of general overall physiological principles associated with metabolic processes; musculoskeletal system; cardiovascular system; aerobic and anaerobic program design.

**Unit-1.**

**15 Hours**

- **Introduction:** Definition of anatomy and its divisions, Terms of location, positions and planes, Cell and its organelles, Tissues & its classification, Glands.
- **Musculoskeletal system:** Structure of Bone & its types, Joints- Classification of joints with examples; details of synovial joint. Bones & joints of upper limb, lower limb and their movements. Axial skeleton & appendicular skeleton. Skull, spine & its movements, intervertebral disc. Muscles & its types. Muscles of the upper limb, lower limb, trunk and neck. Classification of Muscle, structure of skeletal muscle - Neuromuscular Junction - Excitation Contraction Coupling

**Unit-2.**

**15 Hours**

- **Cardiovascular System:** Arteries & veins, Capillaries & arterioles, Red Blood Cells- Functions, count, Physiological variations. Erythropoiesis-stages - Hemoglobin- Functions, Physiological variations. - White Blood cells-Functions, count, morphology. - Platelets-count, morphology, functions.
- **Hemostasis- Definition:** Mechanism, clotting factors. - Blood groups-ABO system, Rh system, Blood transfusion- Indication, transfusion reactions. - Anaemias- classification, morphological and Etiological, effects of anaemia on body. Heart- size, location, chambers, blood supply of heart, pericardium, Systemic & pulmonary circulation, Major blood vessels of Heart- Aorta, pulmonary artery, common carotid artery, subclavian artery, axillary artery, brachial artery, common iliac artery, femoral artery. Inferior vena cava, portal circulation, great saphenous vein, Heart-Physiological Anatomy, Nerve supply, Properties of cardiac muscle.
- **Cardiac Cycle-Events** –systole, diastole - Cardiac Output-Definition and factors affecting it. - Heart sounds-normal heart sounds, its causes, areas of auscultations. - Blood Pressure-Definition, normal value, Physiological variations, its measurement. - ECG- normal waves. - Shock-Definition, Types.

**Unit-3.**

**15 Hours**

**1. Gastro-intestinal System:**

- Parts of GIT, structure of tongue, pharynx, salivary glands, Location & Gross structure of Oesophagus, stomach, intestine (small and large), liver, gall bladder, pancreas,

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spleen. Physiological Anatomy, functions of GIT. Salivary Gland-functions of saliva. Stomach- structure and functions, Gastric secretions-composition, functions, Mechanism - Pancreas- structure, functions, composition of Pancreatic juice. Liver- Functions of liver.

- Bile-Composition, functions. - Jaundice-Types and its causes. - Gall Bladder- Functions - Intestine- Movements of small and large intestine. - Digestion and Absorption of Carbohydrates, Proteins, Fats. - Hormones of GIT- Functions of Gastrin, Secretin, CCKPz.

## Unit-4.

15 Hours

- **Sensory Organs:** Skin & its appendages. Structure of eye & lacrimal apparatus, name of extraocular muscles. Structure of ear: external, middle & inner ear, functions of different parts, Visual acuity, Refractive errors Ear-structure, functions, General mechanism of hearing.
- **Lymphatic System:** Lymph & Lymph vessels. Structure of lymph node, names of regional lymphatics, axillary and inguinal lymph nodes.

## Recommended Text Books / Reference Books:

- 1. Ross and Wilson, 'Anatomy & Physiology.
- 2. Clark, 'Anatomy and Physiology: Understanding the Human Body'.
- 3. Pearce, 'Human Anatomy for Nurses.

APPLIED BIOCHEMISTRY

Subject Code: BRMIS1-102

L T P C  
3 1 0 4

Duration: 60 (Hrs.)

**Course Objectives:**

- Students will be able to learn the terminology of the subject and basic knowledge of basic chemistry and biochemistry involved in physiology of human body. They will be able to understand the reports generated by laboratory and shall be able to convey the surgeon about any critical alert.

**Course Outcomes:**

- Applied Biochemistry is the part of biochemistry where knowledge and methods related to biochemistry are applied to real world problems like to investigate cause of diseases in medicine, to study effect of nutritional deficiencies, to find ways for pest control, improve productivity and storage in agriculture.

**Unit- 1.**

**15 Hours**

- **Cell:** Morphology, structure & functions of cell, cell membrane, Nucleus, chromatin, Mitochondria, Endoplasmic Reticulum, Ribosomes.
- **Carbohydrates:** Definition, chemical structure, functions, sources, classifications, Monosaccharide's, Disaccharides, Polysaccharides, muco-polysaccharide and its importance, glycoprotein
- **Lipids:** Definition, function, sources, classification, simple lipid, compound lipid, derived lipid, unsaturated and saturated fatty acid. Essential fatty acids and their importance, Blood lipids and their implications, cholesterol with its importance.
- **Proteins :** Definition, sources, amino acids, structure of protein, their classification, simple protein, conjugated protein, derived proteins and their properties.
- **Enzymes:** Definitions, mechanism of action, factors affecting enzyme action, enzyme of clinical importance.

**Unit- 2.**

**15 Hours**

- **Nutrition:** Vitamins types, functions and role, Principal minerals and their functions (Ca, P, Mg, Na, K, Cl). Balanced diet, Diet for Chronically and terminally ill patients, post operative patients
- **Bioenergetics:** Energy rich compounds, Respiratory chain and Biological oxidation.

**Unit-3**

**15 Hours**

- **Carbohydrate Metabolism:** Glycolysis, TCA cycle, Glycogen metabolism, Gluconeogenesis, Maintenance of Blood Glucose. Diabetes Mellitus and its complications.
- **Lipid Metabolism:** Beta oxidation, Ketone bodies, Cholesterol and atherosclerosis, obesity.
- **Protein Metabolism:** Transamination, Deamination, Fate of ammonia, urea synthesis and its inborn errors.

**Unit-4-**

**15 Hours**

- **Water and Electrolyte, Fluid compartment, daily intake and output sodium and potassium balance**
- **Nerve tissue:** Neuro transmitters and nerve activity.
- **Hormones:** Actions of Hormone Insulin, Glucagon, Thyroid and Parathyroid hormones, Cortical hormones.
- **Biophysics: Concepts of pH and buffers, osmotic pressure and its physiological applications.**
- Acid Base Balance , role of lungs and kidneys,– Regulation of blood pH, acidosis, Alkalosis
- **Physical Chemistry:** Osmosis, Dialysis, Donann membrane equilibrium
- **Organ function Tests:** Renal and Liver Function Tests.

**Recommended Text Books / Reference Books:**

1. Applied Biochemistry Professional Publications; First Edition
2. Fundamentals Of Applied Biochemistry Auris Publishing

**COMMUNICATION SKILLS**

**Subject Code: BRMIS1-103**

**L T P C  
3 1 0 4**

**Duration: 60 (Hrs.)**

**Course Objective:**

- The students will be able to appreciate communication skills as these are important to everyone - those are how we give and receive information and convey our ideas and opinions with those around us.
- The topic shall also include the 'Soft skills' which is a term often associated with a person's "EQ" (Emotional Intelligence Quotient) which is an important part of their individual contribution to the success of an organization.

**Course Outcomes:**

- These skills can include social graces, communication abilities, language skills, personal habits, cognitive or emotional empathy, and leadership traits.
- The organizations with trained soft skill staff are more successful. Hence in addition to standard qualification the students trained with this course will be able to deal with patients, their fellows and seniors, face to face, in a better way.

**UNIT-1**

**(15Hrs)**

- Basic Language Skills: Grammar and Usage.
- Business Communication Skills with focus on speaking - Conversations, discussions, dialogues, short presentations, pronunciation.

**UNIT-2**

**(15 Hrs)**

- Teaching the different methods of writing like letters, E-mails, report, case study, collecting the patient data etc. Basic compositions, journals, with a focus on paragraph form and organization.
- Basic concepts & principles of good communication

**UNIT-3**

**(15 Hrs)**

- Special characteristics of health communication
- Types & process of communication
- Barriers of communication & how to overcome.

**UNIT-4**

**(15 Hrs)**

- Soft Skills - with important sub-elements:
  - i. Communication Styles
  - ii. Team work
  - iii. Leadership Skills
  - iv. Effective & Excellent Customer Service
  - v. Decision Making & Problem Solving
  - vi. Managing Time and Pressures
  - vii. Self-Management & Attitude.

**Recommended Text Books / Reference Books:**

- Effective Communication and Soft Skills by Nitin Bhatnagar Pearson Education India, 2011
- Communication N Soft Skills Paperback – 2013 by Niraj Kumar, Chetan Srivastava

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**HUMAN ANATOMY AND PHYSIOLOGY – I (PRACTICAL)**

**Subject Code: BRMIS1-104**

**L T P C  
0 0 4 2**

**Duration: 30 (Hrs.)**

**Human Anatomy & Physiology – Practical**

- Demonstration of various parts of body
- Demonstration of cell and tissues of body
- Demonstration of parts of Digestive system.
- Demonstration of various parts of circulatory system
- Examination of blood film for various blood cells from stained slides
- Blood pressure estimation
- Demonstration of structural differences between skeletal, smooth and cardiac muscles
- Demonstration of various bones and joints.
- To study circulatory system from charts and transverse section (TS) of artery and vein.

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**APPLIED BIOCHEMISTRY (PRACTICAL)**

**Subject Code: BRMIS1-105**

**L T P C  
0 0 4 2**

**Duration: 30 (Hrs.)**

- To visit Clinical biochemistry laboratory observe and learn about various tests are being performed in clinical biochemistry laboratory.
- To practice Blood sample collection as per sample draw pattern.
- Basics of various routine laboratory tests performed e.g. determination of blood sugar levels, Liver function tests, renal function tests, and Urine sugar and protein level.
- To understand briefly the interpretation of various tests report to know about critical alerts.
- To visit Blood Gas Analysis laboratory and learn to analyse blood gases.

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**COMMUNICATION SKILLS (PRACTICAL)**

**Subject Code: BRMIS1-106**

**L T P C  
0 0 4 2**

**Duration: 30 (Hrs.)**

- Précis writing and simple passage from a prescribed text books. Atleast100 words should be chosen and few questions from the passage may be said to answer.
- Speaking skill testing: Giving as small topic and to speak for at least two minutes on it.
- Group discussion on profession related topics
- To practice all forms communication i.e. drafting report, agenda notes, précis writing, E. mail drafting, circular, representations, press release, telephonic communication, practice of writing resume and Writing application of employment.
- Organising a mock interview.
- Locate a specified book in the library Find out some words in the dictionary Pronunciation, stress and intonation Give abbreviations of particular words and vice-versa Give meaning of some words Spell some words Practice of handling some communication system like telephone and noting down and conveying message.

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**DRUG ABUSE: PROBLEM, MANAGEMENT AND PREVENTION**

**Subject Code: BRMIS1-107**

**L T P C**

**Duration: 45 (Hrs.)**

**3 0 0 3**

**Course Objectives:**

- To make students understand the concept of drug abuse and their impact on public health.
- To make students understand the types of drugs.
- To make them aware of the impact of drugs addiction on families and peers.
- To make students understand the management and prevention of drug abuse.

**Course Outcomes:**

- Students gain knowledge about detrimental impacts of drug on health and relations.
- Students become aware about the physiological and sociological causes of drug abuse.
- Students acquire knowledge about types of drugs.
- Students acquire knowledge about management and prevention of drug abuse.

**UNIT-1**

**(13 Hours)**

- **Problem of Drug Abuse:** Concept and Overview; Types of Drug Often Abused
- **Concept and Overview**
  - i. What are drugs and what constitutes Drug Abuse?
  - ii. Prevalence of menace of Drug Abuse
  - iii. How drug Abuse is different from Drug Dependence and Drug Addiction?
  - iv. Physical and psychological dependence- concepts of drug tolerance
- **Introduction to drugs of abuse: Short Term, Long term effects & withdrawal symptoms**
- **Stimulants:** Amphetamines, Cocaine, Nicotine
- **Depressants:** Alcohol, Barbiturates- Nembutal, Seconal, Phenobarbital Benzodiazepines Diazepam, Alprazolam, Flunitrazepam
- **Narcotics:** Opium, morphine, heroin
- **Hallucinogens:** Cannabis & derivatives (marijuana, hashish, hash oil), Steroids and inhalants.

**UNIT-2**

**(11 Hours)**

- **Nature of the Problem:** Vulnerable Age Groups, Signs and symptoms of Drug Abuse
  - i. Physical indicators.
  - ii. Academic indicators.
  - iii. Behavioral and Psychological indicators.

**UNIT-3**

**(11 Hours)**

- **Causes and Consequences of Drug Abuse**
- **Causes**
  - (a) Physiological
  - (b) Psychological
  - (c) Sociological
- **Consequences of Drug Abuse**

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- (a) For individuals
- (b) For families
- (c) For society & Nation

**UNIT-IV**

**(10 Hours)**

- **Management & Prevention of Drug Abuse**
  - a) Management of Drug Abuse
  - b) Prevention of Drug Abuse
  - c) Role of Family, School, Media, Legislation & Deaddiction Centers

**Recommended Text Books / Reference Books:**

1. Kapoor. T., Drug Epidemic among Indian Youth, Mittal Pub, New Delhi, 1985.
2. Modi, Ishwar and Modi, Shalini, Drugs: Addiction and Prevention, Rawat Publication, Jaipur, 1997.
3. Ahuja, Ram, Social Problems in India, Rawat Publications, Jaipur, 2003.
4. National Household Survey of Alcohol and Drug Abuse. New Delhi, Clinical Epidemiological Unit, All India Institute of Medical Sciences, 2004.
5. World Drug Report , United Nations Office of Drug and Crime, 2011
6. World Drug Report, United nations Office of Drug and Crime, 2010.
7. Extent, Pattern and Trend of Drug Use in India, Ministry of Social Justice and Empowerment, Government of India, 2004.
8. The Narcotic Drugs and Psychotropic Substances Act, 1985, New Delhi: Universal, 2012.