

**Curriculum and Credit Framework
As per NEP 2020**

For

Bachelors in Medical Laboratory Science (BMLS)

(To be effective from the Academic Session 2023-24)



**Faculty of Life Sciences
Gurugram University, Gurugram
(A State Govt. University Established Under Haryana Act 17 Of 2017)**

Semester 1

Course Code	Course Title	Course ID	L	T	P	Credits	TE	TI	PE	PI	Total
Discipline Specific Courses (DSC)											
240/BMLS/CC/101	General Anatomy-I-Theory		2	1	-	3	50	25	-	-	75
240/BMLS/CC/102	General Physiology-I – Theory		2	1	-	3	50	25	-	-	75
240/BMLS/CC/103	Introduction to Quality And patient Safety- Theory.		3	-	-	3	50	25	-	-	75
240/BMLS/CC1204	Basic Clinical Biochemistry-Theory		3	-	-	3	50	25	-	-	75
240/BMLS/CC/105	General Anatomy-I- Practical		-	-	4	2	-	-	35	15	50
240/BMLS/CC/106	General Physiology-I- Practical		-	-	4	2	-	-	35	15	50
240/BMLS/CC/107	Basic Clinical Biochemistry-Practical		-	-	4	2	-	-	35	15	50
Minor (MIC) /Vocational Courses (VOC)											
40/BMLS/MI/101	Digital Marketing		1	1		2	35	15	-	-	50
Multidisciplinary courses(MDC)											
240/BMLS/MD/101	Music and Dancing- Theory		2			2	35	15	-	-	50
Ability Enhancement Course (AEC)											
240/BMLS/AE/101	English & Communication Skill-Theory		2			2	35	15	-	-	50
Skill Enhancement Course (SEC)/ Internship/Dissertation											
240/BMLS/SE/101	Basic in Computer & Information Science- Theory		3			3	35	15	-	-	50
Value Addition Course(s)											
	Clinical Education –I(studentship)				15	5	-	-	-	-	-
Total Credits						32	Total Marks			650	

Not Evaluated / Kalyana / Dr. Santana / Dr. Manoj Kumar / Anisetti / Namrata / S. Vasava / Chikara

17/10/2020

Semester 3

Course Code	Course Title	Course ID	L	T	P	Credits	TE	TI	PE	PI	Total
Discipline Specific Courses (DSC)											
240/BMLS /CC/301	Systematic Bacteriology- Theory		3	-	-	3	50	25	-	-	75
240/BMLS /CC/302	Basics of Haematological Disease- Theory		2	1	-	3	50	25	-	-	75
240/BMLS /CC/303	Biochemical metabolism- Theory		2	1	-	3	50	25	-	-	75
240/BMLS /CC/304	Immunology&Bacterial serology- Theory		3	-	-	3	50	25	-	-	75
240/BMLS /CC/305	SystematicBacteriology- Practical		-	-	4	2	-	-	35	15	50
240/BMLS /CC/306	Basics of Hematological diseases- Practical		-	-	4	2	-	-	35	15	50
240/BMLS /CC/307	Biochemical metabolism- Practical		-	-	4	2	-	-	35	15	50
240/BMLS /CC/308	Immunology&Bacterialserology - Practical		-	-	4	2	-	-	35	15	50
Minor (MIC) / Vocational Courses (VOC)											
240/BMLS /MI/301	Fundamentals of Histology- Theory		3	-	-	3	50	25	-	-	75
Multidisciplinary courses (MDC)											
240/BMLS /MD/301	Short hand & Typing		2	-	-	2	35	15	-	-	50
Skill Enhancement Course (SEC) / Internship/Dissertation											
240/BMLS /SE/301	Medical Ethics & Legal Aspects- Theory		2	-	-	2	35	15	-	-	50
Total Credits						27	Total Marks			675	

Dr. Jyoti Chavhan | Dr. Kavita Chavhan | Dr. Smita Chavhan | Dr. Hemant Chavhan

17/10/2020

Semester 5

Course Code	Course Title	Course ID	L	T	P	Credits	TE	TI	PE	PI	Total
Discipline Specific Courses (DSC)											
240/BMLS /CC/501	immunopathology&Molecular Biology- Theory		2	1	-	3	50	25	-	-	75
240/BMLS /CC/502	MedicalParasitology&Entomology- Theory		3	-	-	3	50	25	-	-	75
240/BMLS /CC/503	AdvancedHaematology- Theory		2	1	-	3	50	25	-	-	75
240/BMLS /CC/504	AppliedClinicalBiochemistry-II Theory		3	-	-	3	50	25	-	-	75
240/BMLS /CC/505	Immunopathology&Molecular Biology- Practical		-	-	4	2	-	-	35	15	50
240/BMLS /CC/506	MedicalParasitology&Entomology- Practical		-	-	4	2	-	-	35	15	50
240/BMLS /C/507	AdvancedHaematology-Practical		-	-	4	2	-	-	35	15	50
240/BMLS /CC/508	AppliedClinicalBiochemistry-II- Practical		-	-	4	2	-	-	35	15	50
Minor (MIC) / Vocational Courses (VOC)											
240/BMLS /MI/501	PrinciplesofLaboratoryManagement- Theory		2	-	-	2	35	15	-	-	50
Total Credits						22	Total Marks			550	

Dr. Indira / Kalpana / Dr. Sarita / Dr. Manoj
 Anand / Anand / Anand / Anand

12/12/2020

Semester 7&8

Course Code	Course Title	Course ID	L	T	P	Credits	TE	TI	PE	PI	Total
Discipline Specific Courses (DSC)											
240/BMLS/CC/701	Internship/Dissertation/research project- Practical		-	-	720	20	-	-	-	-	200
240/BMLS/CC/801	Internship/Dissertation/research project- Practical		-	-	720	20	-	-	-	-	200
Total Credits						40	Total Marks			200	

Mr. Indira Singh (Kathpura) Dr. Santosh Kumar (Bansohla) Dr. Anurag Singh (Bansohla) Dr. Anurag Singh (Bansohla)

K7/105 C Anurag Singh

Syllabus
FIRST SEMESTER

Course Title: GENERAL ANATOMY-I- THEORY			
Semester: I	Coursecode: BMLS101T	Credits: 03	ICore
No of sessions Lectures/Tutorial: 30		Total Marks: 70	
Course Pre-requisites:		Timing: 3 Hours	

Instructions for paper setter: Examiner is requested to set **one compulsory and eight other questions, two from each unit.** The compulsory question should be of 14 marks and should cover entire syllabus. Student should attempt four other questions i.e. one from each unit.

Course Objectives;

This course is designed to provide the students the basic knowledge in anatomy. At the end of the course, the student should be able to:

1. Comprehend the normal disposition, inter-relationships, gross, functional and applied anatomy of various structures in the human body.
2. Identify the microscopic structures of various tissues, and organs in the human body & correlate the structure with the functions.

Course Outcomes: This course will help the students gain in depth understanding of the anatomy and the fundamental relationship between anatomy and physiology.

Along with the understanding of anatomy, student will learn of the building blocks of matter and the essential organic and inorganic compounds for human functioning.

Unit 1

1. **Introduction to Anatomical terms of the human body**- Basic anatomical terminology, anatomical position, anatomical planes, levels of organization in the body, organ systems, skeleton, cavities of the body.
2. **Organization of the human body at the cellular level**- Structure of the cell comprising of cell membrane, cytoplasm, cell organelles, nucleus, cell extensions etc. Organization of the human body at the tissue level- Epithelial, Connective, Muscular & Nervous tissue.

Unit 2

1. **Blood**- Composition of blood, Features of red blood cells, white blood cells, platelets.
2. **Lymphatic system** - Features of lymph vessels, lymphatic tissue & organs, lymphatics, spleen, tonsil, thymus.
3. **Nervous system** - Central nervous system, brain, cerebellum, spinal cord, cranial nerves, autonomic nervous system.
4. **Muscular system**- Skeletal muscle, cardiac muscle, smooth muscle, muscles of the body.

5. **Skeletal system**-Features of bones, axial skeleton, appendicular skeleton, Musculoskeletal system- Joints of upper & lower limb.

Unit 3

Respiratory system-Nose & paranasal sinuses, pharynx, larynx, trachea, lungs.

Cardiovascular system-Heart & blood vessels.

Digestive system-Oral cavity, pharynx, salivary glands, oesophagus, stomach, small intestine, Large intestine, Liver, Gallbladder.

3. **Urinary system**-Kidneys, juxtaglomerular apparatus, ureters, urinary bladder, urethra.

Unit 4

1. **Introduction to genetics**-Features of chromosomes, DNA.
2. **Reproductive system in females**-External & internal genital organs, breast.
3. **Reproductive system in males**-Penis, scrotum, testes, prostate gland.
4. **Endocrine system**- Hormones, pituitary gland, thyroid gland, parathyroid glands, adrenal glands, endocrine pancreas.
5. **Special senses**-Olfactory system, taste apparatus, external middle & internal ear, eye.
6. **Skin**-Features of skin, hair, sebaceous glands, sweat glands, nails.

The classes will be two theories and two practicals including the tutorials in a week

Course Assessment Scheme

Students would be assessed continuously throughout the semester in the form of continuous evaluation. Periodic tests and surprise tests will be conducted. Students will have to submit written assignments, make charts and posters, make models, and conduct quiz for the topics. Practical will be conducted with viva. Midterm and end term evaluation will be done theoretically and practically. Students will also be assessed on the basis of presentations of various topics.

Reference books:

1. Sampath Madhyastha's Manipal manual of anatomy for allied health sciences
2. Krishna Garg & Madhu Joshi's Practical anatomy workbook
3. Dixit's Atlas of Histology for Medical Students
4. Basic Histology: A Color Atlas & Text
5. Jana's Exam Oriented Practical Anatomy
6. Krishan's Anatomy Mnemonics

Dr. Prashant K. Bhatnagar | Dr. Santosh K. Bhatnagar | Dr. Anurag K. Bhatnagar | Dr. Anurag K. Bhatnagar

12/11/2020

Course Title: GENERAL PHYSIOLOGY-I THEORY			
Semester: I	Coursecode: BMLS 102T	Credits:03	ICore
NoofsessionsLectures/Tutorial:30		Total Marks: 70	
CoursePre-requisites:		Timing: 3 Hours	

Instructions for paper setter: Examiner is requested to set **one compulsory and eight other questions, two from each unit.** The compulsory question should be of 14 marks and should cover entire syllabus. Student should attempt four other questions i.e. one from each unit.

Course Outcome

- This course will help the students gain in depth understanding of the anatomy and physiology and the fundamental relationship between anatomy and physiology.
- Along with the understanding of anatomy and physiology, student will learn of the building blocks of matter and the essential organic and inorganic compounds for human functioning

Course Objectives:

This course is designed to provide the students the basic knowledge in physiology. At the end of the course, the student should be able to:

1. Explain the normal functioning of various organ systems of the body and their interactions.
2. Elucidate the physiological aspects of normal growth and development.
3. Describe the physiological response and adaptation to environmental stresses.
4. Know the physiological principles underlying pathogenesis of disease.

Course contents

Unit 1

1. **Introduction to physiology of the human body** -Composition of body, Homeostasis, Introduction to chemistry of life.
2. **Organization of the human body at the cellular level**-Function of lipids, carbohydrates, proteins & cell organelles.
3. **Organization of the human body at the tissue level**-Function of Epithelial, Connective, Muscular & Nervous tissues.

Unit 2

1. **Blood**-Haemopoiesis, haemostasis, coagulation of blood, blood transfusion.
2. **Lymphatic system**-Function of lymph vessels, lymphatic tissue & organs, lymphatics, spleen, tonsil, thymus.
3. **Resistance & immunity**-Innate immunity, acquired immunity, humoral & cell mediated immunity.

Dr. Jyoti K. Patil, Dr. Santosh K. Patil, Dr. Santosh K. Patil, Dr. Santosh K. Patil

10/10/2020

Unit 3

1. **Nervous system** -Properties of nerve fibres, function of neuroglia, synapse, CNS, CSF, brain, cranial nerves, demonstration of reflexes.
2. **Muscular system** -Properties of skeletal muscle, cardiac muscle, smooth muscle, muscles of the body.
3. **Skeletal system** -Functions of bones, axial skeleton, appendicular skeleton.
4. **Musculoskeletal system** -Movement in the joints of upper & lower limb.

Unit 4

1. **Respiratory system** -Physiology of respiration, pulmonary function tests, gas exchange in lungs, transport of gases between lungs & tissues, regulation of respiration.
2. **Cardiovascular system** -Heart & blood vessels: Systemic circulation, pulmonary circulation, ECG, cardiac output, blood pressure.
3. **Digestive system** -Process of digestion, function of oral cavity, pharynx, salivary glands, esophagus, stomach, small intestine, large intestine, liver, gall bladder, pancreas.
4. **Urinary system** - Function of kidneys, juxtaglomerular apparatus, ureters, urinary bladder, urethra, physiology of urine formation, glomerular filtration, tubular reabsorption, water balance, micturition.
5. **Introduction to genetics** -Features of chromosomes, DNA, protein synthesis, dominant inheritance, recessive inheritance, sex linked inheritance.
6. **Reproductive system-female**: Physiology of female reproductive system.
7. **Reproductive system-male**: Physiology of male reproductive system.
8. **Endocrine system** - Mechanism of action of hormones, function of pituitary gland, thyroid gland, parathyroid glands, adrenal glands, endocrine pancreas.
9. **Special senses** -Physiology of olfaction, taste, hearing, balance & vision.
10. **Skin** - Function of skin, hair, sebaceous glands, sweat glands, nails, temperature regulation.

Reference Books:

1. CC Chatterjee's Human Physiology
2. CC Chatterjee's Practical Physiology for Paramedical Courses
3. CN Chandra Shekhar's Manual of Medical Physiology
4. RK Maurya's Medical Physiology

Definition, waste minimization, BMW-segregation, collection, transportation, treatment and disposal (Including color coding); Liquid BMW, Radioactive waste, metals/chemicals/drug waste, BMW management and methods of disinfection, use of Personal protective equipment (PPE)

Unit5. Infection Prevention and Control

Sterilization, Disinfection, Effective hand hygiene, use of PPE, Prevention and control of common health care associated infections, Guidelines (NABH) and JCI for hospital infection control.

CourseReferences

Texts,Materials,andSupplies:

- Turgeon,Mary Louise.(2015).ClinicalLaboratoryScience,7th ed. MarylandHeights, MO: Mosby. ISBN 9780323225458

Mid. Ludhiana, Kathpura, Dr. Ganga, Dr. Manoj Kumar
Anand, Bankoll, Sivastar, Thakur

K7/ 100, C, 04, 100

Course Title: Basic Preventive Medicine and Community Health Care- Theory			
Semester: I 104T	I Course code: BMLS	Credits:03	ICore
No of sessions Lectures/Tutorial:30		Total Marks: 70	
Course Pre-requisites:		Timing: 3 Hours	

Instructions for paper setter: Examiner is requested to set **one compulsory and eight other questions, two from each unit.** The compulsory question should be of 14 marks and should cover entire syllabus. Student should attempt four other questions i.e. one from each unit.

Course Objectives: The students will learn about the knowledge of various types of diseases and functioning of various programmes. The course provides the students a basic insight into the main features of Indian health care delivery system and how it compares with the other systems of the world.

Learning Outcomes:

After successful completion of this course students will able to:

- Evaluate the immunization program
- Plan a draft for public health policy

Course content-

Unit-1:Introduction:

1. Definition and concepts of health, important public health acts
2. Health problems of developed and developing countries, environment and health.
3. Definition and concepts of epidemiology, diseases, types and use of epidemiology.
4. Basic emergency care and first aid.

Unit-2:Communicable Diseases:

1. Epidemiology, etiology, pathogenesis and control of communicable diseases like malaria, cholera,
2. Tuberculosis, leprosy,
3. Diarrhea, poliomyelitis,
4. Viral hepatitis, measles, dengue, rabies, AIDS.

Unit-3:National Health Policy & Programs:

1. National Health Policy and Programs: DOTS, National AIDS control programme
2. National cancer control programme, Universal immunization programme etc
3. Nutrition and major nutritional problems, etiology, manifestations and prevention, components of RCH care.
4. Examination of water, food adulteration, role of regular exercise and yoga in prevention and management of various diseases.

Unit-4:National Population Problem:

1. Population, problems of population growth, birth rates
2. Death rates, fertility rates, MMR, CPR
3. Approaches and methods of contraception, Reproductive and child health.

4. Hygieneandsanitation,sanitationbarriers,excretadisposal.

Unit-5: Immunization & Health Planning:

1. Immunizationprogramme,variousnationalimmunizationprogramsandvaccineschedules
2. Familywelfareandplanning,communicableandnon-communicabledisease
3. HealthplanninginIndiaincludingvariouscommittees,nationalhealthpolicyandhealthgoals.
4. ObjectivesandgoalsofWHO,UNICEF,IndianRedCrossSociety,UNFPA,FAQ,ILO

Reference Book:

K.Parks&SunderLal,(2015),TextbookofPreventiveSocialMedicine,3rdedition, Bhanot Publications

Course Title: Basic Clinical Biochemistry- Theory			
Semester: I	ICourse code: BMLS 105T	Credits:03	ICore
No of sessions Lectures/Tutorial:30		Total Marks: 70	
Course Pre-requisites:		Timing: 3 Hours	

Instructions for paper setter: Examiner is requested to set **one compulsory and eight other questions, two from each unit.** The compulsory question should be of 14 marks and should cover entire syllabus. Student should attempt four other questions i.e. one from each unit.

Course Objectives: The main objective of the subject is to impart the knowledge of apparatus, units, equipment, and volumetric analysis in the laboratory of clinical Biochemistry.

Course Outcome-

After the completion of this course, students would be able to develop a critical understanding of how biochemical investigations are employed to develop a clinical diagnosis. The students will also be able to gain the necessary professional and research skills required to promote lifelong learning and career development.

The knowledge from this course will help the student in pursuing a career in medical lab technology.

Course Content-

Unit-1:

1. Introduction to Medical lab. Technology, Role of Medical lab Technologist
2. Ethics and responsibility, Safety measures, First aid
3. Cleaning and care of general laboratory glassware and equipment: Steps involved in cleaning soda lime glass; Steps involved in cleaning borosil glass
4. Preparation of chromic acid solution, Storage

Unit-2:

1. Method of preparation of distilled water, Type of water distillation plants, Storage of distilled water
2. Units of Measurement: S.I unit and CGS units, Conversion
3. Strength, molecular weight, equivalent weight
4. Normality, Molarity, Molality, Numerical

Unit-3:

1. Calibration of volumetric apparatus: Flask, Pipettes, Burettes, Cylinders
2. Analytical balance: Principle, Working, Maintenance
3. Concept of pH: Definition, Henderson Hasselbalch equation, Pk value, pH indicator
4. Methods of measurement of pH: pH paper, pH meter, Principle, working, maintenance and

calibration of pH meter

Unit-4:

1. Volumetric analysis: Normal and molar solutions
2. Standard solutions
3. Preparation of reagents
4. Storage of Chemicals

Unit-5: Osmosis: Definition, Types of osmosis, Factors affecting osmotic pressure

1. Specimen collection and Processing of Blood, Urine and CSF, Separation of Serum and Plasma for Biochemical analysis.
2. Deproteinization of sample, Handling of specimens for Testing, Transport of specimen
3. Preservation of specimen, Factors affecting the Clinical results, Effects of Storage on sample

Reference Book:

1. Textbook of Medical Laboratory Technology by P.B. Godker
2. Medical Laboratory Technology by K.L. Mukherjee vol III
3. Practical Clinical Biochemistry by Harold Varley
4. Principles of Biochemistry by M.A. Siddiqi
5. Instrumental Analysis by Chatwal Anand

PRACTICALS

Course Title: GENERAL ANATOMY-I- Practical			
Semester : I	ICoursecode: BMLS106P	Credits: 02	ICore
Number of sessions: 40		Total Marks: 70	
Course Pre-requisites:		Timing: 3 Hours	

Practicals

1. Demonstration of various parts of body
2. Demonstration of tissues of body
3. Demonstration of parts of digestive system
4. Demonstration of parts of respiratory system
5. Demonstration of parts of skin
6. Demonstration of parts of excretory system
7. Demonstration of various parts of circulatory system (Demonstration from models)
8. Examination of blood film for various blood cells from stained slides
9. Blood pressure estimation

Course Title: GENERAL PHYSIOLOGY-I Practical			
Semester : I	ICourse code: BMLS 107P	Credits: 02	ICore
Number of sessions: 40		Total Marks: 70	
Course Pre-requisites:		Timing: 3 Hours	

Practical: demonstration/observation Blood test:

1. Microscope
2. Haemocytometer
3. Blood
4. RBC count
5. Hb
6. WBC count
7. Differential Count
8. Hematocrit demonstration
9. ESR
10. Blood group & Rh. Type
11. Bleeding time and clotting time.

Digestion

Tests of salivary digestions

Excretion

I. Examination of Urine



2. Specific gravity
3. Albumin
4. Sugar
5. Microscopic examination for cells and cysts

Respiratory System:

1. Clinical examination of respiratory system
2. Spirometry
3. Breath holding test

Cardio Vascular System:

1. Measurement of blood pressure and pulse rate
2. Effect of exercise on blood pressure and pulse rate

Reference Books:

5. CC Chatterjee's Human Physiology
6. CC Chatterjee's Practical Physiology for Paramedical Courses
7. CN Chandra Shekhar's Manipal Manual of Medical Physiology

Course Title: Basic Clinical Biochemistry- Practical			
Semester : I	I Course code: BMLS108P	Credits: 02	I Core
Number of sessions: 40		Total Marks: 70	
Course Pre-requisites:		Timing: 3 Hours	

Practical:

1. Cleaning of the laboratory glassware (Volumetric and non-volumetric)
2. Preparation of distilled water
3. Principle, working and maintenance of pH meter.
4. To prepare 0.1N NaOH solution.
5. To prepare 0.2N HCl solution.
6. To prepare 0.1 molar H₂SO₄
7. To prepare 0.2 Molar Sodium carbonate solution.
8. Demonstration of osmosis and dialysis.

Course Title: Basic in Computer & Information Science- Theory			
Semester : I	I Course code : BMLS 109T	Credits: 03	I Core

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17/10/2020

has focus on computer organization, computer operating system and software, and MS windows, Word processing, Excel data worksheet and PowerPoint presentation.

- The students will be able to appreciate the role of computer technology and some extent able to gain hand-on experience in using computers.

Course Outcomes:

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Dr. Jyoti K. Kulkarni	Dr. Smita B. Bhatnagar	Dr. Smita B. Bhatnagar	Dr. Smita B. Bhatnagar
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17/10/2020

o:

- Do basic assembly of the desktop system
- Do effectively MS office
- Do use of internet in effective & meaningful way

Course content-

Unit1

1. Introduction to computer: Introduction, characteristics of computer, block diagram of computer, generations of computer, computer languages.
2. Input/output devices: Input devices (keyboard, point and draw devices, data scanning devices, digitizer, electronic card reader, voice recognition devices, vision-input devices), output devices (monitors, pointers, plotters, screen image projector, voice response systems).
3. Processor and memory: The Central Processing Unit (CPU), main memory.
4. Storage Devices: Sequential and direct access devices, magnetic tape, magnetic disk, optical disk, mass storage devices.

Unit2

1. Introduction of windows: History, features, desktop, taskbar, icons on the desktop, operation with folder, creating shortcuts, operation with windows (opening, closing, moving, resizing, minimizing and maximizing, etc.).
2. Introduction to MS-Word: introduction, components of a word window, creating, opening and inserting files, editing a document file, page setting and formatting the text, saving the document, spell checking, printing the document file, creating and editing of table, mail merge.
3. Introduction to Excel: introduction, about worksheet, entering information, saving workbooks and formatting, printing the worksheet, creating graphs.

Unit3

1. Introduction to power-point: introduction, creating and manipulating presentation, views, formatting and enhancing text, slide with graphs.
2. Introduction of Operating System: introduction, operating system concepts, types of operating system.
3. Computer networks: introduction, types of networks (LAN, MAN, WAN, Internet, Intranet), network topologies (star, ring, bus, mesh, tree, hybrid), components of network.
4. Internet and its Applications: definition, brief history, basic services (E-Mail, File Transfer Protocol, telnet, the World Wide Web (WWW)), www browsers, use of the internet.
5. Application of Computers in clinical settings.

Course Title: English & Communication Skill- Theory			
Semester: I	J Course code: BMLS 110T	Credits: 02	J Core
No of sessions Lectures/Tutorial: 30		Total Marks: 70	
Course Pre-requisites:		Timing: 3 Hours	

Dr. Anil Kumar, Kathana, Dr. Anil Kumar, Dr. Anil Kumar
Anisole, Bantole, Chavastar, Thakral

17/10/2020

Instructions for paper setter: Examiner is requested to set **one compulsory and eight other questions, two from each unit.** The compulsory question should be of 14 marks and should cover entire syllabus. Student should attempt four other questions i.e. one from each unit.

Course Objectives:

1. This course trains the students in oral presentations, expository writing, logical organization and structural support.
2. By acquiring skills in the use of communication techniques the students will be able to express better, grow personally and professionally, develop poise and confidence and achieve success.

Course Outcome-

Students will be able to develop their interpersonal skills, communication skills. Learning to express ideas clearly and persuasively.

Course Content

Unit-1:

1. Basic Language Skills: Grammar and Usage.
2. Business Communication Skills. With focus on speaking- Conversations, discussions, dialogues, short presentations, pronunciation.
3. Teaching the different methods of writing like letters, E-mails, report, case study, collecting the patient data etc.

Unit-2:

1. Basic compositions, journals, with a focus on paragraph form and organization.
2. Basic concepts & principles of good communication.
3. Special characteristics of health communication.

Unit-3:

1. Types & process of communication- verbal, non-verbal and written communication.
2. Upward, downward and lateral communication.
3. Therapeutic communication: empathy versus sympathy.

Unit-4:

1. Communication methods for teaching and learning.
2. Communication methods for patient education.
3. Barriers of communication & how to overcome.

Reference Book:

- Raman, Meenakshi & Sharma, Sangeeta, Technical Communication
- Konar, Nira, Communication Skills For Professionals, PHI Learning Pvt. Ltd-2011
- Board of Editors, Written and Spoken Communication in English, University Press 2007

Dr. Anil Kumar, Dr. Anil Kumar, Dr. Anil Kumar, Dr. Anil Kumar
Dr. Anil Kumar, Dr. Anil Kumar, Dr. Anil Kumar, Dr. Anil Kumar

17/10/2012

Questioning

Stimulus Variation

Illustration with Examples

Explaining

Lesson Planing: Meaning, Importance & types.

Possibilities of notation for Indian Music: Critical study of Bhatkande and Vishnu

Digambar Pulskar

Voice-culture-importance in Indian context

UNIT 3

Teaching Methods

Qualities

Instructions for paper setter: Examiner is requested to set **one compulsory and eight other questions, two from each unit.** The compulsory question should be of 14 marks and should cover entire syllabus. Student should attempt four other questions i.e. one from each unit.

Course Outcome-

Demonstrate increased movement skills, concentration and physical control in performing movement for artistic expression.

Course Content-

Music-

UNIT 1

Music: Concepts, Aims and Objectives

- Concept of Music, types and importance of Music in present scenario
- History of Indian Music: Ancient, Medieval and Modern period.
- Aims and objectives of Music as a subject in the School curriculum.
- Bloom's Taxonomy and Instructional objectives in teaching of Music

UNIT 2

Teaching Skills, Lesson Planning, Notation and Voice Culture of Indian Music

- Micro-teaching skills: Meaning, Process, Utility, Merits, Limitations
- Introducing the Lesson



**s of Music Teacher, Motion and Rhythm, Aesthetics in
Indian Music**

**Meth
ods of
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Music**

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**Dem
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**Indiv
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**Quali
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Music
Teacher-
Gayak,
Vadak
and
Avadyak
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Dr. Jyoti	Dr. Anand	Dr. Anand	Dr. Anand
Dr. Anand	Dr. Anand	Dr. Anand	Dr. Anand

17/ 12/ 19 19 19 19

Knowledge and Importance of Taal/Motion and Rhythm and its training

Aesthetics in Indian Music

UNIT 4

Instructional Aids, Textbooks, Classical Music, Evaluations

Meaning and Importance of Audio-visual Instructional Aids in Teaching of Music

Textbooks: Meaning, Importance of textbooks in teaching of Music, Qualities of a good textbooks of Music

Importance of Classical Music, Suggestions for the popularization of Classical Music.

Evaluation in Music: Meaning, Purpose, Importance, Evaluation Devices-Oral, Written

nd Practical

Tasks & Assignments: Any one of the following (10 marks)

Tuning of the instrument related to the subject of the students.

Collection of Musical documents (Notes, Newspaper and Magazines Articles cutting).

Preparation of Project Report on the legends of Music.

Preparation of low cost teaching aids.

Any other project/ assignment given by the institution.

Semester : I	J Course code: BMLS 111T	Credits:02	JCore
No of sessions Lectures/Tutorial:30		Total Marks: 70	
Course Pre-requisites:		Timing: 3 Hours	

Instructions for paper setter: Examiner is requested to set **one compulsory and eight other questions, two from each unit.** The compulsory question should be of 14 marks and should cover entire syllabus. Student should attempt four other questions i.e., one from each unit.

Course outcome-

Measures the success of a digital marketing campaign.

Apply the knowledge about metrics in digital marketing.

Unit-1 Introduction to Digital Marketing	Principles of Digital Marketing; Digital Marketing Channels; Tools to Create Buyer Persona; Competitor Research Tools, Website Analysis Tools, etc.
Content Marketing	Content Marketing Concepts & Strategies; Planning, Creating, Distributing & Promoting Content; Optimize Website UX & Landing Pages; Measure Impact; Metrics & Performance; Using Content Research for Opportunities, etc.
Unit 2- Social Media Marketing	Introduction; Major Social Media Platforms for Marketing; Developing Data-driven Audience & Campaign Insights; Social Media for Business; Creation & Optimization of Social Media Campaigns, etc.
Search Engine Optimization	Search Engine Optimization Fundamentals; Keywords and SEO Content Plan; SEO & Business Objectives; Writing SEO Content; On-site & off-site SEO; Optimize Organic Search Ranking, etc.
Unit 3- Web Analytics & Google Analytics	Google Analytics Tools; Web Analytics Tools, etc:
E-mail Marketing	Effective E-mail Campaigns; E-mail Plan; E-mail Marketing Campaign Analysis; Measuring Conversions & keeping up, etc.
Web Design	Web design, optimization of websites; Publishing a basic website; User-centred Design and Website Optimization; Design Principles and Website Copy; Website Metrics & Developing Insight, etc.
Introduction to CRM	Fundamentals to CRM; CRM Platforms; CRM Models; CRM Strategy, etc.
Unit- 4- Video Advertising	Basics of Video Advertising; Creating Video Campaigns; Measurement & Optimization; Creating & Managing a YouTube Channel; Targeting Video Campaigns, etc.
Digital Marketing Budgeting	Digital Marketing Budget & Plan; Resource Planning; Cost Estimating; Cost Budgeting; Cost Control

Not to be used for any other purpose
 Assistant Professor
 Dr. S. Srinivasan
 Dr. Srinivasan

17/10/2020

PRACTICALS

Course Title: General Anatomy-II- Practical		
Semester: II	Course code: BMLS205P	Credits: 02
Number of sessions: 40		Total Marks: 70
Course Pre-requisites:		Timing: 3 Hours

ANATOMY PRACTICAL

- 1) Identification and description of all anatomical structures.
- 2) Demonstration of dissected parts
- 3) Demonstration of skeleton-articulated and disarticulated.
- 4) Surface anatomy: Surface landmark-bony, muscular and ligamentous. Surface anatomy of major nerves, arteries of the limbs.

Reference books:

- Sampath Madhyastha's Manual of anatomy for allied health sciences
- Krishna Garg & Madhu Joshi's Practical anatomy workbook
- Jana's Exam Oriented Practical Anatomy

11. To demonstrate the different morphological types of bacteria
12. Preparation of one culture media from each type
13. To demonstrate aerobic culture
14. To demonstrate anaerobic culture

Course Title: Basic Haematology & Clinical Pathology - Practical			
Semester: II	Course code: BMLS 208P	Credits: 02	Core
	I		
Number of sessions: 40		Total Marks: 70	
Course Pre-requisites:		Timing: 3 Hours	

Practical:

1. Preparation of various anticoagulants:
 - 1.1 EDTA
 - 1.2 Sodium Citrate
 - 1.3 Oxalate with Fluoride
 2. Collection of blood sample for various Lab Investigations
 3. Familiarization and working of routine Haematology Lab.
 4. Instruments
 - 4.1 Microscopes
 - 4.2 Haemocytometers
 - 4.3 Colorimeter
 - 4.4 Spectrophotometer
 - 4.5 Glass pipettes & Auto pipettes
 - 4.6 Glassware
 - 4.7 Sahli's Apparatus
- Identification of Normal blood cells
- Urine Analysis:
- Routine biochemistry of Urine for: Physical Examination
- Biochemical Examination Microscopic Examination of Urine

Course Title: Basic in Computer & Information Science- Practical			
Semester : I	ICoursecode: BMLS209P	Credits: 02	ICore
Number of sessions: 20		Total Marks: 70	
Course Pre-requisites:		Timing: 3 Hours	

Practical:

- Introduction to computer: Introduction, characteristics of computer, computer languages.
- Input output devices
- Central Processing Unit
- Storage Device
- Operation with Window
 - i. Introduction to MS-Word: introduction, components of a word window, creating, opening and inserting files, editing a document file, page setting and formatting the text, spell checking, printing the document file, creating and editing of table, mail merge.
- Introduction to Excel: introduction, about worksheet, entering information, saving workbooks and formatting, printing the worksheet, creating graphs.
- Introduction to power-point: introduction, creating and manipulating presentation, views, formatting and enhancing text, slide with graphs.

diagnosis of the following bacteria:-

1. Proteus, Salmonella, Shigella, Yersinia enterocolitica and Yersinia pestis.
2. Vibrio, Aeromonas and Plesiomonas
3. Clostridia of wound infection
4. Mycobacterium tuberculosis complex, Atypical Mycobacteria and M. leprae

Unit-5: Definition, Classification, Various, pathogenesis and laboratory diagnosis of the following bacteria:-

1. Spirochetes- Treponema, Borrelia and leptospira
2. Bordetella and brucella, Mycoplasma and Ureaplasma, Rickettsia, Chlamydia,
3. Actinomyces, Pseudomonas and Burkholderia
4. Brief introduction about non-spore forming aerobic cocci and bacilli

Reference Book:

1. Practical Medical Microbiology by Mackie & McCartney Volume 1 and 2
2. Textbook of Microbiology by Ananthanarayanan
3. Medical Microbiology by Paniker & Satish Gupte

Course Title: Basics of Haematological Disease- Theory			
Semester: III	ICoursecode: BMLS302T	Credits: 03	ICore
No of sessions Lectures/Tutorial: 30		Total Marks: 70	
Course Pre-requisites:		Timing: 3 Hours	

Instructions for paper setter: Examiner is requested to set **one compulsory and eight other questions, two from each unit.** The compulsory question should be of 14 marks and should cover entire syllabus. Student should attempt four other questions i.e. one from each unit.

Learning Objectives: The students will be made aware of various diseases like anemia, quantitative disorders of Leucocytes, morphological alterations in blood cells, bleeding disorders.

Course outcome- in this subject is imparted to enable the students to carry out routine clinical laboratory investigation (blood, urine etc.). The students will be made aware of various diseases like anemia, quantitative disorders of Leucocytes, morphological alterations in blood cells, bleeding disorders.

Unit-1: Anemia:

1. Introduction, Classification, Clinical Features, Evaluation and Investigation.
2. Microcytic hypochromic anemia
3. Macrocytic anemia
4. Normocytic normochromic anemia

Unit-2: Anemia:

1. Quantitative disorders of Leukocytes Cause and significance
2. Granulocytic and Monocytic Disorders
3. Lymphocytic Disorders
4. Morphologic Alterations in Neutrophils, Toxic granulation, Cytoplasmic vacuoles, Dohle bodies, May-Haggling anomaly Alder-Reilly anomaly, Pelger-Huet anomaly, Chediak-Higashi syndrome.

Unit-3: Bleeding disorders:

1. Introduction, definition, types and causes of bleeding.
2. Vascular defect, Platelet defect
3. Factor deficiency
4. Inhibitors, Hyperfibrinolysis

Unit-4: Types of bleeding disorders:

1. Inherited bleeding disorders
2. Acquired bleeding disorders
3. Thrombosis: Introduction & Causes of thrombosis
4. Monitoring of Anticoagulants, Oral anticoagulants by INR, Heparin

Unit-5: Evaluation of bleeding disorders:

1. Patient History, Clinical Features

2. BT, CT, Platelets Count
3. PT, APTT, PTT
4. D-Dimer test, Fibrinogen Assay

Reference Book:

1. Textbook of Medical Laboratory Technology by Praful B. Godkar
2. Medical Laboratory Technology by K. L. Mukherjee Volume-I
3. Practical Haematology by J. B. Dacie

Course Title: Biochemical Metabolism- Theory			
Semester: III	ICourse code: BMLS303T	Credits: 03	ICore
No of sessions Lectures/Tutorial: 30		Total Marks: 70	
Course Pre-requisites:		Timing: 3 Hours	

Instructions for paper setter: Examiner is requested to set **one compulsory and eight other questions, two from each unit.** The compulsory question should be of 14 marks and should cover entire syllabus. Student should attempt four other questions i.e. one from each unit.

Learning Objectives: This subject shall give information about all the major metabolic pathways occurring in our body. The students will learn the details about metabolism of carbohydrates, proteins, lipids, nucleic acids, enzymes & the deficiency diseases related to them.

Course outcome- This subject shall give information about all the major metabolic pathways occurring in our body. The students will learn the details about metabolism of carbohydrates, proteins, lipids, nucleic acids, enzymes & the deficiency diseases related to them.

Unit-1: Carbohydrate Metabolism:

1. Introduction, Importance and Classification
2. Digestion and Absorption
3. Metabolism: - Glycolysis, Citric acid cycle, Gluconeogenesis, Glycogenolysis, Glycogenesis
4. Disorders of carbohydrate metabolism.

Unit-2: Protein Metabolism:

1. Introduction, Importance and classification, Important properties of proteins
2. Digestion & absorption of Proteins
3. Protein synthesis, Metabolism of proteins
4. Disorders of protein metabolism and Urea Cycle

Unit-3: Lipids:

1. Introduction & Classification
2. Digestion & absorption of fats
3. Lipoproteins
4. Fatty acid biosynthesis & fatty acid oxidation

1. Introduction & Functions of Nucleic acid
2. Brief about structure of DNA & RNA, DNA Replication, & Transcription
3. Advances in Genetic Engineering
4. Vitamins: Definition, classification, functions dietary sources, daily requirement & Deficiency disorders.

Unit-5: Enzymes & Hormones:

1. Introduction, Importance, Classifications & Properties of enzymes
2. Mechanism of enzyme action, Factors affecting enzyme action
3. Enzyme kinetics & enzyme inhibitors
4. Hormones: Introduction, Definition & Classification of hormones. Mechanism of hormone action, Effects of hormones on various metabolism & hormonal disorders

Reference Book:

1. Practical Clinical Biochemistry by Harold Varley
2. Textbook of Medical Laboratory Technology by P.B. Godker
3. Medical Laboratory Technology by Mukherjee
4. Principles of Biochemistry by M.A. Siddiqi
5. Instrumental Analysis by Chatwal Anand

Course Title: Fundamental of Histology- Theory			
Semester: III	Course code: BMLS304T	Credits: 03	ICore
No of sessions Lectures/Tutorial: 30		Total Marks: 70	
Course Pre-requisites:		Timing: 3 Hours	

Instructions for paper setter: Examiner is requested to set **one compulsory and eight other questions, two from each unit.** The compulsory question should be of 14 marks and should cover entire syllabus. Student should attempt four other questions i.e. one from each unit.

Learning Objectives: The student will study diseases associated with different body organs and systems.

Learning outcome-: The student will study diseases associated with different body organs and systems

Unit-1: Alimentary & Digestive System:

1. Diseases of mouth, Diseases of Esophagus-Esophageal varices.
2. Digestive System: Gastritis, Peptic ulceration, Appendicitis microbial-diseases, food poisoning, hernia, Intestinal obstructions & mal absorption.
3. Accessory Digestive glands: Salivary glands-mumps Liver-hepatitis, liver failure, cirrhosis. Pancreas pancreatitis.
4. Gall Bladder- Gallstones, jaundice and cardiovascular diseases.

Unit-2: Circulatory & Respiratory System:

1. Diseases of Blood vessels-Atheroma, Arteriosclerosis, heart block.
2. Disorders of Blood Pressure-Hyper & Hypotension.
3. Respiratory System: Upper respiratory tract infection, Bronchi, Asthma
4. Pneumonia, Lung abscess, Tuberculosis, Lung Collapse.

Unit-3: Urinary & Reproductive System:

1. Glomerulonephritis, Nephrotic syndrome, renal failure, renal calculi
2. Urinary obstruction, Urinary tract infection.
3. Reproductive system: Sexually transmitted diseases, Pelvic inflammatory disease
4. Disorder of cervix {CIN}, Disease of ovaries, ectopic pregnancy, prostatitis, Infertility.

Unit-4: Nervous, Endocrine System & Sense Organs:

1. Neuronal damage, ICP, Cerebral Infarction, head injury, Alzheimer's disease, dementia.
2. Endocrine System, Pituitary: Hyper & Hyposecretions.
3. Thyroid: Goiter, Adrenal: Cushing Syndrome, Addison Disease, Pancreas: Diabetes.
4. Ear: Otitis, Eye: Cataract.

Reference Book:

1. Anatomy & Physiology-Ross and Wilson
2. Human Anatomy and Physiology by Pearce
Di Fiore's Atlas of Histology

Course Title: Immunology & Bacterial Serology- Theory			
Semester: III	ICoursecode: BMLS305T	Credits: 03	ICore
No of sessions Lectures/Tutorial: 30		Total Marks: 70	
Course Pre-requisites:		Timing: 3 Hours	

Instructions for paper setter: Examiner is requested to set **one compulsory and eight other questions, two from each unit.** The compulsory question should be of 14 marks and should cover entire syllabus. Student should attempt four other questions i.e. one from each unit.

Learning Objectives: This section will cover the basic aspects of immunity, antigens, antibodies, various serological reactions, techniques and their utility in laboratory diagnosis of human diseases. It will also cover medically important fungi, infections caused by them and their laboratory diagnosis.

Course outcome-This section will cover the basic aspects of immunity, antigens, antibodies, various serological reactions, techniques and their utility in laboratory diagnosis of human diseases. It will also cover medically important fungi, infections caused by them and their laboratory diagnosis.

Unit-1: History and introduction to immunology:

1. Immunity
2. Innate
3. Acquired immunity
4. Basic concepts about their mechanisms

Unit-2: Antigen & Antibody

1. Definition, types of antigens and determinants of antigenicity
2. Definition, types, structure and properties of immunoglobulin
3. Antigen-Antibody reactions: Definition, Classification, General features and mechanisms
4. Applications of various antigen-antibody reactions

Unit-3: Techniques Used in Medical Microbiology:

1. Principle, procedure and applications of under mentioned in Medical Microbiology:
Complement fixation test
2. Immuno-fluorescence, ELISA
3. SDS-PAGE
4. Western blotting

Unit-4: Serological Test & Complement System:

1. Principle, procedure and interpretation of various serological tests:
Widal, VDRL, ASO
1. CRP, Brucella tube agglutination, Rose-Waaler
2. Complement system: Definition, Basic concepts about its components
3. Complement activation pathways

Unit-5: Immune Response, Hypersensitivity & Vaccines:

- Immune response: Introduction, Basic concepts of Humeral and Cellular immune responses
- Hypersensitivity: Definition, Types of hypersensitivity reactions

- Basic concepts of autoimmunity and brief knowledge about autoimmune diseases
- Automation in diagnostic serology
- Vaccines: Definition, Types, Vaccination schedule
- Brief knowledge about Extended programme of immunization (EPI) in India

Reference Book:

1. Practical Medical Microbiology by Mackie & McCartney Volume 1 and 2
2. Textbook of Microbiology by Ananthanarayanan
3. Medical Microbiology by Paniker & Satish Gupte
4. Medical Laboratory Technology Vol. I, II, III by Mukherjee
5. Medical Laboratory manual for tropical countries Vol II Microbiology by Monica Cheesbrough
- Immunology by Ri

PRACTICAL

Course Title: Systematic Bacteriology- Practical			
Semester: III	I Course code: BMLS306P	Credits: 02	I Core
Number of Session: 40		Total Marks: 70	
Course Pre-requisites:		Timing: 3 Hours	

PRACTICAL

1. To demonstrate the instruments used to seed culture media
2. To learn techniques for Inoculation of bacteria on culture media
3. To isolate specific bacteria from a mixture of organisms.
4. To demonstrate simple staining (Methylene blue)

5. To prepare India ink preparation to demonstrate negative staining.
6. Bacterial identification: To demonstrate reagent preparation, procedure and interpretation for
 - 6.1 Gram stain
 - 6.2 Albert stain
 - 6.3 Neisser's staining
 - 6.4 Z-N staining
 - 6.5 Capsule staining
 - 6.6 Demonstration of flagella by staining methods
 - 6.8 Spore staining

- 6.8 To demonstrate spirochetes by Fontana staining procedure

7. To prepare the reagent and demonstrate following biochemical tests with positive and negative control bacteria:
 - 7.1 Catalase
 - 7.2 Coagulase
 - 7.3 Indole
 - 7.4 Methyl Red (MR)
 - 7.5 Voges Proskauer (VP)
 - 7.6 Urease
 - 7.7 Citrate
8. To demonstrate various characteristics (morphological, cultural and biochemical) of bacteria commonly isolated from clinical samples i.e.
 - 8.1 Staphylococcus
 - 8.2 Streptococcus
 - 8.3 Corynebacterium
 - 8.4 Escherichia coli
 - 8.5 Klebsiella
 - 5.1 Proteus
 - 5.2 Salmonella

Course Title: Basics of Hematological Diseases- Practical			
Semester: III	Course code: BMLS307P	Credits: 02	Core
Number of Session: 40		Total Marks: 70	
Course Pre-requisites:		Timing: 3 Hours	

Practical

1. Part of microscope; its functioning and care
2. Part of centrifuge; its functioning and care
3. General Blood Picture
4. TLC Count
5. DLC Count
6. Platelets Count
7. Demonstration of Normal & Alternative forms of RBC, s
8. Demonstration of Normal & Alternative forms of WBC, s
9. PT, APTT, PTT Test
10. BT, CT & Fibrinogen Assay
11. Haemoglobin estimation methods (Sahli's, Oxyhaemoglobin, and cyanmethaemoglobin)
12. Preparation of thick and thin blood smear for malarial parasite (Leishman/Giemsa/JSB)

Course Title: Biochemical Metabolism- Practical			
Semester: III	ICoursecode: BMLS308P	Credits: 02	ICore
Number of Session: 40		Total Marks: 70	
Course Pre-requisites:		Timing: 3 Hours	

PRACTICAL

1. To determine the presence of carbohydrates by Molisch test.
2. To determine the presence of reducing sugar by Fehling's solutions
3. To determine the presence of reducing sugar by Benedict's method.
4. To determine starch by Iodine test.
5. Determination of Glucose in serum & plasma
6. Estimates of blood Glucose by Folin & Wu method
7. Determination of Urea in serum, plasma & urine.
8. Determination of Creatinine in serum or plasma
9. Determination of serum Albumin
10. Determination of Cholesterol in serum or plasma

Course Title: Immunology & Bacterial Serology- Practical			
Semester: III	ICoursecode: BMLS309P	Credits: 02	ICore
Number of Session: 40		Total Marks: 70	
Course Pre-requisites:		Timing: 3 Hours	

Practical:

1. Collection of blood sample by vein puncture, separation and preservation of serum
2. Performing Haemolysis titration for Rose-Waaler test
3. Preparation of Phosphate buffers, Verinol buffer, ASO buffer, Richardson's buffer, Buffers of different pH and Molarity, tris buffer, Standardization of cell concentration by Spectrophotometer
4. Performance of Serological tests i.e., Widal, Brucella Tube Agglutination, VDRL (including Antigen Preparation), ASO (Anti-Streptolysin=O)



- C-Reactive Protein (Latex agglutination) Rheumatoid factor (RF) Latex agglutination
5. Demonstration of antigen/antibody determination by Immune fluorescence (IF)
 6. immune diffusion, precipitation in Agarose gel (Ouchterlony)
 7. CIEP, ELISA, SOS-PAGE and Western blotting.

Course Title: Medical Ethics and Legal Aspects- Theory			
Semester: II 205T	Course code: 310BMLS	Credits: 02	ICore
No of sessions Lectures/Tutorial: 20		Total Marks: 70	
Course Pre-requisites:		Timing: 3 Hours	

Instructions for paper setter: Examiner is requested to set **one compulsory and eight other questions, two from each unit.** The compulsory question should be of 14 marks and should cover entire syllabus. Student should attempt four other questions i.e. one from each unit.

Course Objectives:

This course is designed to provide the students the basic knowledge in laws and ethics to follow as health professionals. After completion of the course the students will be able to: Understand the various definitions

Course outcome- Legal and ethical considerations are firmly believed to be an integral part of medical practice in planning patient care. Advances in medical Science, growing sophistication of the modern society's legal framework, increasing awareness of human rights and changing moral principles of the community at large, now result in frequent occurrences of healthcare professionals being caught in dilemmas over aspects arising from daily practice.

Course Contents

Unit- 1

Role, Definition and Interaction with the patients and healthcare professionals, Ethical, Moral, and Legal Responsibilities, Patient safety and quality, restraint policies and role of health professionals. Biomedical waste Management, medical records and reports.

Unit-2

Medical terminology- The course employs a body systems-oriented, word-analysis approach to learning medical terminology.

Unit- 3

The goal of the class is to prepare students for the terminology they might encounter in their subsequent coursework, in their clinical rotations and ultimately in their roles as health care professionals.

Dr. J. J. ... Dr. ... Dr. ... Dr. ...

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BooksRecommended

www.wikiOedia.in

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FIFTH SEMESTER

Syllabus

Course Title: Immunopathology & Molecular Biology- Theory			
Semester: V	Course code: BMLS501T	Credits: 03	ICore
No of sessions Lectures/Tutorial: 30		Total Marks: 70	
Course Pre-requisites:		Timing: 3 Hours	

Instructions for paper setter: Examiner is requested to set **one compulsory and eight other questions, two from each unit.** The compulsory question should be of 14 marks and should cover entire syllabus. Student should attempt four other questions i.e. one from each unit.

Learning Objectives: The students will learn how to analyze various clinical patients' samples, for estimation of different components which are the cause of the immune disease or are the diagnostic/prognostic markers. This subject gives information about various clinically important cells of immune system, lymphoid organs, antigen, antibody, Ag-Ab. reactions, transplant immunology etc. & automation techniques. Molecular biology concerns the molecular basis of biological activity between biomolecules in the various systems of a cell, including the interactions between DNA, RNA and proteins and their biosynthesis, as well as the regulation of these interactions.

Course outcome- The students will learn how to analyze various clinical patients' samples, for estimation of different components which are the cause of the immune disease or are the diagnostic/prognostic markers. This subject gives information about various clinically important cells of immune system, lymphoid organs, antigen, antibody, Ag-Ab. reactions, transplant immunology etc. & automation techniques. Molecular biology concerns the molecular basis of biological activity between biomolecules in the various systems of a cell, including the interactions between DNA, RNA and proteins and their biosynthesis, as well as the regulation of these interactions. A basic introduction of molecular biology and its techniques like PCR, RTPCR etc.

Unit-1: History & Introduction:

1. Historical background, general concepts of the immune system,
2. innate and adaptive immunity; active and passive immunity
3. Primary and secondary immune response.
4. Cells and Organs of the immune system, Lymphoid organs of the Immune system, MHC I & II

Unit-2: Antigen & Antibody:

1. Antigen and haptens: Properties, foreignness, molecular size, heterogeneity.
2. Antibodies: Historical perspective of antibody structure; structure, function and properties of the antibodies
3. Different classes, subclasses and biological activities of antibodies; concepts of antibody diversity, isotype, allotype,
4. Introduction of hybridoma technology, monoclonal antibodies, polyclonal antibody

Dr. Jyoti Chavhan, Dr. Anurag Chavhan, Dr. Anurag Chavhan, Dr. Anurag Chavhan
Assistant Professor, Assistant Professor, Assistant Professor, Assistant Professor

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Unit-3:HLA&Hypersensitivity:

1. HLA Typing & Cross matching
2. Transplant Immunology.
3. Hypersensitivity: Definition, Types, Mechanisms, Autoimmunity
4. Immunotolerance: Basic concepts.

Unit-4: Molecular Biology:

1. Introduction to Molecular Biology
2. Relationship of Mol. Biology with other Science.
3. Molecular Biology Techniques: Principle, Reagents used, procedure and applications in medical diagnostics.
4. Polymerase Chain Reaction and its advanced versions, Gel electrophoresis, Western blot.

Unit-5: Molecular Biology:

1. Chemical composition of DNA, DNA replication.
2. DNA damage and repair.
3. Regulation of prokaryotic and eukaryotic gene expression
4. Cell Cycle.

Reference Book:

1. Immunology by Ivan Roitt, Jonathan Brostoff and David Male
2. Immunology by Kuby
3. Medical Immunology by Daniel P Stites
4. Basic & Clinical Immunology by P. Daniel Fudenberg, H. Hugh and Stites
5. Elements of Biotechnology by PK Gupta

Course Title: Principles of Laboratory Management- Theory			
Semester: V	ICoursecode: BMLSS02T	Credits: 02	ICore
No of sessions Lectures/Tutorial: 20		Total Marks: 70	
Course Pre-requisites:		Timing: 3 Hours	

Instructions for paper setter: Examiner is requested to set **one compulsory and eight other questions, two from each unit.** The compulsory question should be of 14 marks and should cover entire syllabus. Student should attempt four other questions i.e. one from each unit.

Learning Objectives: The objective of this module is to help the students will be made aware of the basic ethics, good lab practices including awareness/safety in a clinical lab & aware various Accrediting body.

Course outcome- The students will be made aware of the basic ethics, good lab practices including awareness/ safety in a clinical lab. In addition they will understand sample accountability, quality management system, biomedical waste management, calibration and validation of clinical laboratory instruments

Unit-1:

1. Ethical Principles and standards for a clinical laboratory professional duty to the patient, duty to colleagues and other professionals
2. Good Laboratory Practice (GLP), Introduction to Basics of GLP and Accreditation
3. Aims of GLP and Accreditation, Advantages of Accreditation
4. Brief knowledge about National and International Agencies for clinical laboratory accreditation

Unit-2:

1. Awareness/Safety in a clinical laboratory, General safety precautions.
2. HIV: pre-and post-exposure guidelines, Hepatitis B & C: pre-and post-exposure guidelines;
3. Drug Resistant Tuberculosis Patient management for clinical samples collection, transportation and preservation.
4. Sample accountability, Purpose of accountability, Methods of accountability

Unit-3:

1. Sample analysis: Introduction, factors affecting sample analysis.
2. Reporting results, basic format of test report, reported reference range.
3. Clinical alerts, abnormal results, results from referral laboratories.
4. Release of examination results, alteration in reports

Unit-4:

1. Quality Management system: Introduction, Quality assurance, Quality control system.
2. Internal and External quality control, quality control chart and importance of calibration and Validation of Clinical Laboratory instrument.
3. Ethics in Medical laboratory Practice, Ethics in relation to Pre-Examination procedures, Examination procedures, reporting of results, preserving medical records

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Procurement of equipment and Inventory Control

Unit-5:

1. Audit in a Medical Laboratory.
2. Introduction and Importance, NABL & CAP.
3. Responsibility, Planning, Horizontal, Vertical and Test audit.
4. Frequency of audit, Documentation

Reference Book:

1. Teitz, (2007), Fundamentals of Clinical Chemistry, 6th edition, Elsevier Publications
2. Bishop (2013), Clinical Chemistry, 7th edition, Wiley Publications

Course Title: Medical Parasitology & Entomology- Theory			
Semester: V	ICoursecode: BMLS503T	Credits: 03	ICore
No of sessions Lectures/Tutorial: 30		Total Marks: 70	
Course Pre-requisites:		Timing: 3 Hours	

Instructions for paper setter: Examiner is requested to set **one compulsory and eight other questions, two from each unit.** The compulsory question should be of 14 marks and should cover entire syllabus. Student should attempt four other questions i.e. one from each unit.

Learning Objectives: The student will be taught about introduction, general characteristics, life cycle and laboratory diagnosis of various medically important parasites.

Course outcome- The student will be taught about introduction, general characteristics, life cycle and laboratory diagnosis of various medically important parasites.

Unit-1: Introduction to Medical Parasitology & Protozoology:

1. Introduction to Medical Parasitology with respect to terms used in Parasitology.
2. Protozoology/Protozoal parasites: General characteristics of protozoa.
3. Geographical distribution, Habitat, Morphology, life cycle, Mode of infection and laboratory diagnosis of Entamoeba sp.
4. Geographical distribution, Habitat, Morphology, life cycle, Mode of infection and laboratory diagnosis of Intestinal and vaginal flagellates i.e., Giardia, Trichomonas sp.
5. Geographical distribution, Habitat, Morphology, life cycle, Mode of infection and laboratory diagnosis of blood and tissue flagellates i.e., Plasmodium and Toxoplasma sp.

Unit-2: Helminthology/Helminthic parasites-I:

1. General characteristics of Cestodes, Trematodes and Nematodes
2. Geographical distribution, Habitat, Morphology, life cycle, Mode of infection and laboratory diagnosis of: Taenia solium and saginata
3. Echinococcus granulosus, Hymenolepis nana
4. Chistosoma haematobium and mansoni

Unit-3: Helminthology/Helminthic parasites-II:

1. Geographical distribution, Habitat, Morphology, life cycle, Mode of infection and laboratory diagnosis of: Fasciola hepatica and buski
2. Trichuris trichura, Trichinella spiralis
3. Strongyloides stercoralis, Ancylostoma duodenale, Enterobius vermicularis
4. Ascaris lumbricoides, Wuchereria bancrofti, Dracunculus medinensis

Unit-4: Diagnostic Procedure-I:

1. Examination of Stool for parasites for intestinal protozoa! infections: Collection of stool samples, Preparation of material for unstained and stained preparations, Staining methods i.e., Iodine staining and permanent staining
2. For Helminthic infections: Concentration techniques i.e., Flotation and sedimentation techniques, Egg counting techniques

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Course Title: Advanced Haematology-I- Theory			
Semester:V	Coursecode:BMLS 504T	Credits:03	Core
No of sessions Lectures/Tutorial:30		Total Marks: 70	
CoursePre-requisites:		Timing: 3 Hours	

Instructions for paper setter: Examiner is requested to set **one compulsory and eight other questions, two from each unit.** The compulsory question should be of 14 marks and should cover entire syllabus. Student should attempt four other questions i.e. one from each unit.

Learning Objectives: The students will be made aware of different anemia, Leukemia, chromosomal studies, bleeding disorders and radiation hazards.

Course outcome-The students will be made aware of different anemia, Leukemia, chromosomal studies, bleeding disorders and radiation hazards

Unit-1: Anaemias-I:

Definition, causes, changes in blood morphology due to the following anaemias and special tests-

1. Iron deficiency anemia
2. Megaloblastic anaemia,
3. Aplastic anaemia
4. Sideroblastic anaemia

Unit-2: Anaemias-II:

Definition, causes, changes in blood morphology due to the following anaemias and special tests

1. Sickle cell anaemia, Autoimmune hemolytic anaemia,
2. Hereditary spherocytosis, G6PD deficiency anaemia
3. Thalassemia
4. Sickling test, Osmotic fragility test, Schilling test, Serum Iron, Iron binding capacity.

Unit-3: Leukemia:

1. Definitions, morphology, identification of various abnormal cells in common Leukemia's
2. Acute Leukemia: AML, ALL
3. Chronic Leukemia: AML, CLL
4. Plasmacytoma.

Unit-4: Bleeding Disorders:

1. Hemophilia A, B & Von-Willebrand disease
2. DIC,
3. Platelet disorder (Qualitative and quantitative)
4. Laboratory approach for investigating thrombosis

Unit-5:RadioisotopesMeasurement:

1. Usingradioisotopesmeasurementof:Blood volume
2. DeterminationofRedcellvolumeandPlasmavolume
3. Redcelllifespan,Plateletlifespan
4. Radiationhazardsanditsprevention,Disposalofradioactive material

Reference Book:

1. TextbookofMedicalLaboratoryTechnologybyParafulB.Godkar
2. Medical laboratoryTechnologybyKLMukherjeeVolume-I
3. PracticalHaematologybyJBDacie
4. ClinicalDiagnosis&ManagementbyLaboratorymethods {20thedition}byJohnBernardHenary
5. AtlasofHaematology {5thedition}byG.A.McDonald

Course Title: Applied Clinical Biochemistry-II- Theory			
Semester: V	Course Code: BMLS 505T	Credits: 03	Core
No of Sessions Lectures/Tutorial: 30		Total Marks: 70	
Course Pre-requisites:		Timing: 3 Hours	

Instructions for paper setter: Examiner is requested to set **one compulsory and eight other questions, two from each unit.** The compulsory question should be of 14 marks and should cover entire syllabus. Student should attempt four other questions i.e. one from each unit.

Learning Objectives: The students will learn how to analyze various clinical patients' samples, estimation of different components which are the cause of the disease or are the dia

Course outcome- The students will learn how to analyze various clinical patients' samples, for estimation of different components which are the cause of the disease or are the diagnostic/prognostic markers. This subject gives information about various clinically important enzymes & automation techniques.

Course content-

Unit-1: Automation in clinical biochemistry:

1. Automation in clinical biochemistry
2. Method of estimation and assessment for: Glucose tolerance test
3. Method of estimation and assessment for: Insulin tolerance test
4. Method of estimation and assessment for: Xylose excretion test.

Unit-2: Gastric analysis & Qualitative Test:

1. Gastric analysis.
2. Clearance test for renal function.
3. Qualitative test for: Urobilinogens, Barbiturates
4. Ketosteroids

Unit-3: Organ Profile Test:

1. Lipid Profile Test
2. Renal Function Test
3. Thyroid Function Test
4. Liver Function Test & Cardiac Function Test

Unit-4: Enzymes:

Enzymes: Principles, Clinical significance and Procedures for estimation: Acid phosphatase, Alkaline phosphatase

1. Lactate dehydrogenase
2. Aspartate transaminase
3. Alanine transaminase & Creatine phosphokinase

Unit-5: Body Cavity Fluid:

1. Qualitative analysis of Renal calculi.
2. Chemical examination of Cerebrospinal fluid.

Dr. Indira Kulkarni, Dr. Varsha Chaudhari, Dr. Anurag Singh, Dr. Anurag Singh, Dr. Anurag Singh, Dr. Anurag Singh

17/10/2020

3. Chemical examination of Ascitic fluid & Pleural Fluid.
4. Brief knowledge about rapid techniques in clinical biochemistry

Reference Book:

1. Textbook of Medical Laboratory Technology by P.B. Godkar.
2. Medical Laboratory Science, Theory & Practical by A. Kolhatkar.
3. Practical Clinical Biochemistry by Harold Varley.
4. Biochemistry, U. Satyanarayan & U. Chakrapani.

Course Title:- Immunopathology and Molecular Biology- Practical			
Semester: V	ICoursecode: BMLS506P	Credits: 02	ICore
Number of Session: 40		Total Marks: 70	
Course Pre-requisites:		Timing: 3 Hours	

PRACTICAL:

1. Peripheral blood mononuclear cell (PBMC) isolation by gradient centrifugation
2. T and B cell separation
3. Immunofluorescence
 - 3.1 Anti-Nuclear Antibody (ANA)
 - 3.2 Anti-Neutrophil Cytoplasmic Antibody (ANCA)
4. AIDS Immunology and Pathogenesis (AIP)
5. Thyroid Microsomal antigen (TMA)-Agglutination reactions
6. Electrophoresis
7. Gel diffusion
8. Nephelometry
9. HLA
 - 9.1 Typing Serology & Crossmatch
 - 9.2 Molecular Typing
10. Nitroblue Tetrazolium Chloride Test (NBT)
11. FACS for CD4 and CD8
12. ELISA for lab. diagnosis of AIDS
13. Polymerase Chain Reaction and its advanced versions
14. Gel electrophoresis
15. Western blotting
16. Isolation of DNA and RNA
17. Estimation of DNA and RNA

Course Title:-Medical Parasitology & Entomology- Practical			
Semester:V	ICoursecode:BMLS507P	Credits:02	ICore
NumberofSession: 40		Total Marks: 70	
CoursePre-requisites:		Timing: 3 Hours	

Practical:

1. Routine stool examination for detection of intestinal parasites with concentration methods:
 - 1.1 Saline preparation
 - 1.2 Iodine preparation
 - 1.3 Floatation method
 - 1.4 Centrifugation method
 - 1.5 Formal ether method
 - 1.6 Zinc sulphate method
2. Identification of adult worms from models/slides:
 - 2.1 Tapeworm
 - 2.2 Tapeworm segments
 - 2.3 Ascaris (Roundworm)
 - 2.4 Hookworms
 - 1.5 Pinworms
3. Malarial parasite:
 - 3.1 Preparation of thin and thick smears
 - 3.2 Staining of smears
 - 3.3 Examination of smears for malarial parasites (*P. vivax* and *P. falciparum*)

Course Title:- Applied Clinical Biochemistry-II – Practical			
Semester:V	ICoursecode:BMLS509P	Credits:02	ICore
NumberofSession: 40		Total Marks: 70	
CoursePre-requisites:		Timing: 3 Hours	

Practical:

1. Estimation of Glucosetolerancetest(GTT).
2. EstimationofInsulintolerancetest(ITT).
3. DeterminationofUric acid inUrine.
4. DeterminationofCreatinineclearance.
5. DeterminationofUreaclearance.
6. DeterminationofSerumacid phosphatase.
7. DeterminationofSerumAlkalinephosphatase.
8. DeterminationofSerumLactatedehydrogenase.
9. DeterminationofT3,T4andTSH

