HAND BOOK FOR STUDENTS

B.Sc. MEDICAL LABORATORY TECHNOLOGY COURSE

Dr. NTR UNIVERSITY OF HEALTH SCIENCES
ANDHRA PRADESH,
VIJAYAWADA.

UPDATED VERSION
(APPROVED BY EXECUTIVE COUNCIL IN ITS 228th MEETING HELD ON 05-05-2018)

CONTENTS

REGULATIONS AND SYLLABUS OF
B.Sc MEDICAL LABORATORY TECHNOLOGY COURSE

These regulations shall be called "The revised regulations for the B.Sc MLT course the Dr. NTR University of health sciences, Vijayawada". These regulations are applicable to the students who are admitted to the course from the academic year 2013-2014.

1. *Title of the Course*:-

The Course shall be called Bachelor of Science in Medical Laboratory Technology i.e., B.Sc. (MLT) course.

2. *Eligibility for Admission*:-

1. The candidates should have passed the two year Intermediate course examination with Physics, Chemistry and Biology, conducted by the Board of Intermediate Education, Government of Andhra Pradesh or any other examination considered as equivalent thereto by Dr. NTR University of Health Sciences, Vijayawada for Admission to the B.Sc. (MLT) Degree Course.

2. As per the G.O.Ms no. 258 students with 2 yrs Diploma in Medical Lab Technology can be permitted for admission into B.Sc M.L.T. Degree Course offered by this University. However the college offering diploma should have been approved by the government of Andhra Pradesh. They are required to qualify a test conducted by Dr.NTR UHS.

3. *Age Limit* :

The candidate should have completed the age of 17 years on or before 31st December of the year of admission.

4. *Duration of the course*:

Duration of the Course shall be for a period of three academic years. All the candidates must be full time students of the Course. There should be a minimum of 240 working days excluding holidays and vacation. The curriculum should be completed in 10 months duration to qualify the students to appear for the examination.

5. *Medium*:

The medium of instruction and examination shall be English.

6. Subjects of Study

First Year:	Second Year:	Third Year:
1) English 2) Anatomy 3) Physiology 4) Clinical Laboratory Practice	1) Pathology-I 2) Microbiology-I 3) Biochemistry-I	1) Pathology-II 2) Microbiology-II 3) Biochemistry-II

7. *Examinations*:

The examinations will be conducted at the end of each academic year both in theory and practicals. The supplementary examinations will be conducted within 6 months after the main examination conducted by the University for all the three phases of the course. Teachers with MD/MS qualification with one year experience and M.Sc(M) with three years experience may be appointed as Examiners.

8. *Attendance*:

a) A candidate shall be considered to have satisfied the requirement of attendance if he / she attends not less than 75% of the classes held in each of the subjects separately for theory and practical postings in each academic year. However, if the attendance of students is 60% and above but below 75%, it may be condoned by the University on the recommendation of the Principal and on the payment of condonation fee as prescribed by the University.

b) A candidate who does not satisfy the requirements of attendance in any subject shall not be permitted to take the University examination in that particular subject and he / she shall be required to appear the same in a subsequent exam.

9. *Hours of tuition*:

YEAR	Lectures / week	Practical / Tutorial / week	Total hours / week.
FIRST YEAR			
1. English Language	6	-	6
2. Anatomy	3	3	6
3. Physiology	3	3	6
4. Clinical Laboratory Practice	5	12	17

SECOND YEAR			
1. Pathology-I	4	8	12
2. Microbiology-1	4	8	12
3. Biochemistry – I	4	8	12
THIRD YEAR			
1. Pathology-II	4	8	12
2. Microbiology-II	4	8	12
3. Biochemisry –II	4	8	12

10. Model Time Tables:

		First Year B.Sc (MLT)				
		Model Time Table				
	Theory (1 hr) 9 - 10 AM	Practical (2 hrs) 10 - 12 AM	Theory (1 hr) 12 - 1 PM	1 - 2 PM	Theory (1 hr) 2 - 3 PM	Practical (1 hr) 3 - 4 PM
Monday	English	Central Laboratory	Clinical Lab Practice	L U N C H	Anatomy	Student's Lab Anatomy/ Physiology
Tuesday	English	Central Laboratory	Clinical Lab Practice		Physiology	Student's Lab Anatomy/ Physiology
Wednesday	English	Central Laboratory	Clinical Lab Practice		Anatomy	Student's Lab Anatomy/ Physiology
Thursday	English	Central Laboratory	Clinical Lab Practice		Physiology	Student's Lab Anatomy/ Physiology
Friday	English	Central Laboratory	Elective hour		Anatomy	Student's Lab Anatomy/ Physiology
Saturday	English	Central Laboratory	Elective Hour		Physiology	Student's Lab Anatomy/ Physiology

Second & Third Year B.Sc (MLT)

Model Time Table

	Theory (1 hr) 9 - 10 AM	Practical (2 hrs) 10 AM- 1 PM	1 - 2 PM	Theory (1 hr) 2 - 3 PM	Practical (1 hr) 3 - 4 PM
Monday	Pathology	Laboratory Posting Pathology - 3 months 10 days Biochemistry - 3 months 10 days Microbiology - 3 months 10 days	L U N C H	Biochemistry	Student's Lab Path/Micro/ Bio as per posting
Tuesday	Biochemistry			Microbiology	
Wednesday	Microbiology			Pathology	
Thursday	Pathology			Biochemistry	
Friday	Biochemistry			Microbiology	
Saturday	Microbiology			Pathology	

11. ***Scheme of Examination***:

The examination for the B.Sc. (MLT) shall be held at the end of each academic year of the course ordinarily in April / May, A supplementary examination also will be held in the middle of each Academic year ordinarily in October / November.

FIRST YEAR	**THEORY**		**PRACTICALS**		
	Univer'ty	**I.A.**	**University**	**I.A. + Record**	**Total**
	(Min:40%)	(Min:35%)	(Min:50%)	(Min:35%)	(Min: Aggr.50%)
1. English Language	80	20	NA	NA	100
2. Anatomy	80	20	40	5 + 5	150
3. Physiology	80	20	40	5 + 5	150
4. Clinical Laboratory practices	80	20	40	5 + 5	150
SECOND YEAR	**THEORY**		**PRACTICALS**		
	Univer'ty	**I.A.**	**University**	**I.A. + Record**	**Total**
	(Min:40%)	(Min:35%)	(Min:50%)	(Min:35%)	(Min: Aggr.50%)
1. Pathology- 1	80	20	40	5 + 5	150
2. Microbiology- 1	80	20	40	5 + 5	150
3. Biochemistry- 1	80	20	40	5 + 5	150
THIRD YEAR	**THEORY**		**PRACTICALS**		
	Univer'ty	**I.A.**	**University**	**I.A. + Record**	**Total**
	(Min:40%)	(Min:35%)	(Min:50%)	(Min:35%)	(Min: Aggr.50%)
1. Pathology-II	80	20	40	5 + 5	150
2. Microbiology-II	80	20	40	5 + 5	150
3. Biochemistry-II	80	20	40	5 + 5	150
NA – Not Applicable.					

11. A. Scheme of Theory examination:

1. Duration of Theory Examination : 3 Hours
2. Scheme of Theory Examination

Two out of three essay questions of	10 marks each	2 x 10 = 20
Six out of eight short note questions of	5 marks each	6 x 5 = 30
Ten Brief short note questions of	3 marks each	10 x 3 = 30
	Total Theory	= 80

For English: Two essay question of 20 marks each	2x 20 = 40
Five short note questions of 8 marks each	5 x 8 = 40
Total	= 80

3. Theory paper wise distribution of syllabus:

Year	Paper	Syllabus
1st	1. English	Prose, Poetry, Grammar
1st	2. Anatomy	Basics and Primary considerations of the human body as a whole, locomotion, anatomy of the nervous system, circulatory system, respiratory system, digestive system, excretory system, reproductive system endocrine system.
1st	3. Physiology	Blood, CVS, Digestive system, respiratory, endocrine, nervous system, special senses, Muscles and nerve, reproductive system, excretory system
1st	4. Clinical Laboratory Practice	Laboratory Services, Infrastructure in the laboratories, Specimen Collection, Storage and Transport, Standard operating Procedure, Safety in Laboratories, Ethical considerations, Quality assurance, Bio waste management, Accidents and emergencies in the laboratory.
2nd	1) Pathology-I	Histopathology, cytology, clinical pathology, hematology museum techniques, instrumentation
2nd	2) Microbiology-I	General Microbiology, immunology, Systemic Bacteriology.
2nd	3) Biochemistry-I	Chemistry and Metabolism of Carbohydrates and Proteins, Instrumentation, concepts of molecular weight atomic weight, Normality, molarity; acids, bases and buffers.
3rd	1) Pathology-II	Flow and imaging cytometry, Tissue culture, cytogenetics, Immuno-histochemistry, Immuno-cytochemistry, Special stains, Frozen Sections and Cryostat, Hemorrhagic disorders, Blood transfusion and immuno Haematology, Instrumentation.
3rd	2) Microbiology-II	Virology, Mycology, Parasitology.
3rd	3) Biochemistry-II	(Metabolism, Nutrients, techniques, Estimation of blood components including enzymology, ELISA)

11. B. Scheme of Practical Examinations:

1. Duration of Practical Examination: 3 Hours
2. Scheme of Practical Examination:
   a. Practicals - 40
   b. I.A. - 5
   c. Record - 5

Year	Practical Exams	Scheme
1st	1) English	No practical
1st	2) Anatomy consist of identification of 20 spotters X 2 marks each = 40 Marks	1. Histology slides - 4x2 = 8 2. Abdomen, Thorax, Pelvis - 8x2 = 16 3. Head & Neck organ - 1x2 = 2 4. Brain - 1x2 = 2 5. Upper Limb Bones - 2x2 = 4 6. Lower Limb bones - 2x2 = 4 7. Head, Neck & Thorax Bones - 2x2 = 4 (20 diagrams to be drawn in records)
1st	3) Physiology Practicals – Marks 40	1. Hematology – 15 2. Spotters (RBC/ WBC / Platelets / Blood Groups or instruments.) – 10 3. Staining &WBC Differential count – 10 4. Recording of BP/ Auscultation of Heart sounds – 5
1st	4) Clinical Laboratory practice	Practical Examination: 1. Spotters – 10 Marks 2. SOP of various tests subject wise any two - 20 Marks 3. Bio medical Waste Management - 10 Marks
2nd	1) Pathology-I Practicals – 40 Marks	1. Spotters - 5 2. Urine - 5 3. Cytology –'PAP' smear staining - 5 4. BTCT - 10 5..Haematology- a. Blood smear staining (Leishman's) - 5 6. Estimation of HB - 10
2nd	2) Microbiology-I Practical Marks 40	1. Spotters - 10 2. Staining – Grams / ZN stain/Albert - 10 3. Identification of a bacterium - 10 a) Growth characteristics – 5 Marks b) Biochemicals any two – 5 Marks 4. Estimation of pH - 10

2nd	3) Biochemistry-I Practical Marks –40 (Any two practical each carrying 20 marks)	1. Preparation of normal/molar/percent solutions of a chemical. 2. Estimation of free & total acidity in gastric juice 3. Identification of carbohydrates 4. Determination of Urea, NH_3 , Uric acid, creatinine 5. Abnormal constituents of Urine

Year	Practical Exams	Scheme
3rd	1) Pathology-II Practical- 40 Marks	Spotters - **5** Special stain (PAS, Reticulin, Van Gieson) - **15** Section cutting and H& E staining - 10 Blood groups - 10
3rd	2) Microbiology-II Practical- 40 Marks	Spotters - 10 Mycology – fungal Identification & Interpretation by tease mount - 10 Virology– Rapid test – Interpretation & Discussion - 10 Stool Examination - Saline & Iodine wet mount - 10
3rd	3) Biochemistry-II Practical 40 Marks (Any two practical exercises each carrying 20 marks)	1. Plasma Protein estimation, CSF analysis Albumin & Globulin 2. Electrophoretic pattern of S.Proteins, Lipoproteins, Hb 3. Estimation of Acid & ALk Phosphatase, LDH, SGOT, SGPT, Amylase, isoenzymes 4. Estimation of total bilirubin and direct bilirubin 5. S. Iron, TIBC & G6PD Elisa technique for CEA, AFP, T_3, T_4, TSH, HCG

12. ***Internal Assessment***:-

1. There shall be a minimum of two periodical tests preferably one in each term in theory & practical of every subject in an academic year, and the average of the two awards will be taken as the final award in that subject. If a candidate is absent for any one of the tests due to genuine and satisfactory reasons such a candidate may be given a re-test.
2. The internal assessment examination shall be conducted uniformly in all colleges in a particular period as notified by the University.
3. The internal assessment marks shall be sent to the University as per the notification including details of the examiners who conducted the exam and valued the papers. The examination papers shall be valued by the qualified examiners only.
4. The marks of the Internal Assessment must be displayed on the notice boards of the colleges.
5. Multiple choice questions (upto 20%) may be introduced in internal assessment examination.
6. The candidate should score a minimum 35% in Theory and Practical Internal assessment examination, separately to be eligible to appear in the University examination in that subject.
7. Fresh Internal assessment is mandatory for referred and detained students. The previous internal assessment marks will not be considered.

13. **Appearance for the Examination:**

a) A candidate shall register for all the subjects of a year when he / she appears for the examinations of that year for the first time.

b) A candidate shall not be admitted to the practical examinations for the first time unless he / she produces the class record book duly certified by the Head of the Department.

c) The marks awarded to the record during the first appearance will be valid for the subsequent examinations in case of failed candidates.

14. Re-totaling of answer scripts:

There is no provision for reevaluation of answer books in the University. However, as per the rules of the university the students can request for re-totaling on payment of Rs.500/-. On receipt of student's application along with fee, a date for re-totaling will be announced by the University. The student has to attend personally on the said date to identify the answer book, which will be shown to the student. The faculty members who are posted for the job will take up the correction of the errors in the re-totaling and correction of un-valued questions. Modification of the results if any will be declared as per the rules of the University.

15. Minimum for a Pass:

a) A candidate shall be declared to have passed in a subject if he / she obtains not less than 40% in the written and 50% in practical examinations in the University examination and an Aggregate of 50% marks including the Internal Assessment.

b) If a candidate fails in either theory or practicals he / she has to appear for both theory and practicals in the subject in any subsequent examination and he / she must obtain the minimum marks as specified above for a pass in that subject.

16. Classification of successful Candidates:

Class shall be declared for the first, second and third year examinations on the basis of aggregate marks

Percentage of marks for:-

I class with distinction : Not less than 70% of the aggregate marks.

I class : 69% to 60% of the aggregate marks.

Second class : 59% to 50% of the aggregate marks.

17. Promotion Criteria:

a) A candidate with two backlog subjects in First year may be promoted to Second Year B.Sc(MLT).

b) A candidate with one backlog subject in Second Year B.Sc(MLT) may be promoted to the Third Year B.Sc(MLT) course but the candidate has to clear all the backlog subjects of 1st and 2nd year to be eligible to appear for Third Year B.Sc(MLT).

18. Vacation:

There will be a vacation of 30 days per year. The period between the completion of University examination (either theory or practical whichever conducted later) and the date of declaration of results may be considered as vacation period. The Principal/Head of the Institution can decide the remaining period of vacation.

1st Year
B.Sc (MLT)

SYLLABUS

1st Year

PAPER – 1 ENGLISH

Placement – First year Time: Theory – 60 hours

Course Description: The Course is designed to enable students to enhance ability to comprehend spoken and written English (and use English) required for effective communication in their professional work. Students will practice their skills in verbal and written English during clinical and classroom experiences.

Unit	Time (Hrs)	Learning Objectives	Content	Teaching Learning Activities	Assessment methods
I	10	• Speak and write grammatically correct English	• Review of Grammar • Remedial study of Grammar • Building Vocabulary • Phonetics • Public Speaking	• Demonstrate use of dictionary • Class-room conversation • Exercise on use of Grammar • Practice in public speaking	• Objective Type • Fill in the blanks • Para phrasing
II	30	• Develop ability to read, understand and express meaningfully the prescribed text	• Read and comprehend prescribed course books	• Exercise on : • Reading • Summarizing • Comprehension	• Short Answers • Essay Types

III	10	• Develop writing skills	• Various forms of composition Letter writing Note taking Precis writing, Resume/CV	• Exercises on writing Letter writing Story writing Resume/CV • Essay writing Discussion on written reports/ documents	• Assessment of the skills based on the check list
IV	6	• Develop skill in spoken English	• Spoken English Oral report Discussion Debate Telephonic conversation	• Exercise on: Debating Participating in Seminar, panel, symposium Telephonic conversation	• Assessment of the skills based on the check list
V	4	• Develop skill in listening comprehension	• Listening Comprehension Media, audio, video, speeches etc.	• Exercise on: Listening to audio, video tapes and identify the key points	• Assessment of the skills based on the check list

Prescribed Text Book:
English for B.Sc., Nursing by Ms. P. Angela Vanaja Kumari
& Prof. Mrs. R.S. Caroline
Front line Publications, Hyderabad.

1st Year

PAPER – 2 HUMAN ANATOMY

The students of B.Sc. M.L.T. will not be doing the dissection of cadaver. Demonstrations should be given in such a way that they have as clear understanding of the human anatomy as possible.

I. THE HUMAN BODY AS A WHOLE:

Definitions, Subdivisions of Anatomy, Terms of location and positions, Fundamental Planes, Vertebrate structure of man and organisation of the body cells and tissues.

II. LOCOMOTION AND SUPPORT:

THE SKELETAL SYSTEM:

Types of bones, structure of bone, divisions of the skeleton, Appendicular skeleton, Axial skeleton - names of all the bones and their parts; joints - classification, types of movements with examples.

PRACTICALS - Demonstrations of all bones - showing parts.
Joints - X-rays of all normal bones and joints.

III. ANATOMY OF THE NERVOUS SYSTEM

CENTRAL NERVOUS SYSTEM:

Spinal cord; Anatomy, functions reflex actions, Meninges, Main and Fundamental parts of Brain: Hind Brain, Midbrain – Forebrain – Brain, location, functions, coverings of brain.

Injuries to spinal cord and brain - excluded

IV. ANATOMY OF CIRCULATORY SYSTEM:

Heart size, location, coverings, chambers, blood supply, Blood vessels, General plan of circulation, pulmonary circuit - Names of arteries and veins and their positions

Only histology of lymphatic system - included

PRACTICAL: Demonstration to illustrate.

V. ANATOMY OF THE RESPIRATORY SYSTEM:

Organs of Respiratory System – Nose-nasal cavity, Trachea, Bronchial Tree.

PNS & Larynx topics - excluded.

Pleurae and lungs, brief knowledge of parts and position.

PRACTICAL: Demonstration to illustrate.

VI. ANATOMY OF THE DIGESTIVE SYSTEM:

Components of Digestive system, Alimentary tract, Anatomy of organs of Digestive System, Mouth, Tongue, Salivary glands, Liver, Biliary apparatus, Pancreas, Spleen-positions and brief functions.

PRACTICAL: Demonstration to illustrate

VII. ANATOMY OF EXCRETORY SYSTEM AND REPRODUCTIVE SYSTEM

Kidneys - location, gross structure;
ureters, Urinary bladder, Urethra.

Male Reproductive System : Testis, duct system.
Female Reproductive System: Ovaries, Duct system, Accessory organs.

PRACTICAL: Illustrations

VIII. ANATOMY OF THE ENDOCRINE SYSTEM:

Names of all endocrine glands and their positions;
Only Hormones of endocrine glands - included.
(Thyroid, Parathyroid, Pituitary and Adrenal glands, Gonads and Islets of pancreas)
Functions of endocrine glands - excluded.

HISTOLOGY

IX. General Slides:

1. Hyaline Cartilage
2. Fibro Cartilage
3. Elastic Cartilage
4. T.S & L.S.Bone
5. Blood Vessels
6. Tonsils
7. Spleen
8. Thymus
9. Lymph node
10. Epithelial Tissue
11. Skeletal and Cardiac Muscle - Excluded
12. Peripheral nerve and optic nerve - Excluded

X. Systemic Slides:

1. G.I.T – Fundamental structure of G.I.T. & Liver, Stomach, Small intestine
2. R.S. - Lung, Trachea
3. Kidney
4. Endocrines - Pituitary, Thyroid and Parathyroid
   - Adrenal
   - Pancreas.
5. Reproductive System: Ovary, Testis
   Uterus - Excluded,

1st Year

PAPER – 3 PHYSIOLOGY

1. HEMATOLOGY (16 hrs):

1. BLOOD: Composition, properties and functions of Blood.
2. RBC: Size, shape, functions, count, Physiological variations of RBC count Polycythemia, Erythropoiesis.
3. HAEMOGLOBIN: Function, concentration, Physiological variation of concentration; methods of determination of Hb.
4. WBC: Functions, production, life span, count, leukocytosis, Leukopenia, Leukemia, DLC.
5. PLATELET: Size, Shape, count, production, Functions, Thrombocytopenic Purpura, bleeding time, clotting time.
6. BLOOD GROUPS: ABO and Rh grouping, criteria of classification, Antigen and Antibodies, percentage of distribution, Determination of Blood groups. Landsteiner's Law, significance of Blood groups.
7. BLOOD TRANSFUSION: Indication, general qualities of a donor, matching of donor's blood with recipient's blood, universal donor and recipient concept. Blood grouping or typing, cross matching, mismatched blood transfusion: causes and complications. Rh factor and Rh factor incompatibility – transfusion and erythroblastosis foetalis.
8. HAEMOSTASIS: Vasoconstriction, platelet plug formation, blood coagulation – Definition, clotting factors – Mechanism of blood clotting – Intrinsic and Extrinsic. Intravascular blood blotting, disorders of clotting, Vit.K deficiency bleeding, purpura, Haemophilia.
9. ANTICOAGULANTS: Classification, example and uses.
10. BLOOD BANK
11. BLOOD INDICES: Color index, MCH, MCV, MCHC.
12. ESR and PCV: Determination, definition, values, variations, factors affecting, significance.
13. BLOOD VOLUME: Normal value, determination of blood volume and regulation of blood volume.
14. LYMPH - Lymphoid tissue formation, circulation, composition and functions of Lymph.

2. CARDIOVASCULAR SYSTEM (12 hrs):

1. Heart –brief description of function.
2. BLOOD PRESSURE: Definition, Normal values, physiological variations, factors affecting regulation of BP, Hypotension and Hypertension, Determination of BP.
3. PULSE: Jugular pulse, radial pulse.
4. HEART SOUNDS: Cause, characteristics and significance – and phonocardiogram.
5. ECG: Definition, determination, significance, coronary circulation.

3. DIGESTIVE SYSTEM (8 hrs):

1. Functions of Digestive system. Physiological Anatomy of G.I.T. T.S. of Intestine, Nerve supply.
2. Saliva composition and Functions. Structure and functions of stomach. Properties, composition and functions of gastric juice. Functions of pancreas, composition, properties and functions of Pancreatic Juice. Functions of Liver, Properties, Composition and functions of bile. Gall bladder functions and its emptying; Jaundice. Functions of large intestine – composition and functions of succus entericus.
3. Defaecation – stool, normal.

4. RESPIRATORY SYSTEM (10 hrs):

1. Functions of Respiratory system, stages of Respiration.
2. Transportation of Respiratory Gases.
3. Transportation of O_2: Direction, pressure gradient. Forms of transportation, Oxygenation of Hb. Quantity of O_2 transported.
4. Transportation of CO_2. Direction, pressure gradient, modes of transportation.
5. Spirometry: Spirogram, Spirometer.
6. LUNG VOLUMES: Tidal Volume, Inspiratory Reserve Volume, Expiratory Reserve Volume, Vital Capacity, Forced Expiratory Volume 1, Forced Expiratory Volume 2, Forced Expiratory Volume 3,

5. ENDOCRINE SYSTEM (12 hrs):

1. HORMONE: Definition, Local and General Hormones, properties of Hormones, Endocrine glands of the body and their location.
2. PITUITARY: Situation, Master Endocrine Gland; Anterior and Posterior Parts, Anterior pituitary Hormones, functions and regulation of secretion of each of them, Dwarfism Acromegaly, Gigantism.
3. POSTERIOR PITUITARY: ADH, and Oxytocin-source, functions, diabetes insipidus.
4. THYROID GLAND: Physiological Anatomy and location, Hormones secreted, Physiological functions, endocrine disorders – Hypo and Hyper secretion – Goitre, Cretinism, Myxedema, Grave's disease.
5. ADRENAL GLAND: Adrenal Cortex - Hormones secreted: Gluco corticoids, Mineralocorticoids, sex steroids, functions of cortisol and Aldosterone.
6. Endocrine Disorders – Addison's disease, Cushing's syndrome, Conn's syndrome, Adrenogenital syndrome.
7. ADRENAL MEDULLA: Functions of adrenaline and Nor-Adrenaline.
8. PANCREAS: Hormones of Pancreas: Insulin-functions and actions, Glucagon - functions and actions. Regulation of blood glucose level; Diabetes Mellitus.
9. PARATHYROID GLAND: PTH functions and actions. Hypo and Hyper secretion of PTH, tetany.
10. CALCITONIN: Functions and actions, Regulation of blood calcium level.

6. NERVOUS SYSTEM (12hrs):

1. Functions of Nervous System in brief : of all parts of CNS
2. EEG
3. CSF: formation, circulation, properties, composition and functions; lumbar puncture.

7. SPECIAL SENSES (6hrs):

1. VISION: functions of different parts of the eye. Refractive errors of eye and correction. Field of vision. Structure and functions of retina, Pupillary reflexes, color vision: color blindness, tests for color blindness.
2. HEARING: functions of outer, middle and inner ear, Deafness and Tests for deafness. Rinne's test. Weber's test.

8. Excretory System: Excretory Organs (10 hrs):

1. KIDNEYS: Functions of kidneys,
2. Functional unit nephron.

3. Mechanism of Urine Formation: GFR,
4. Selective Reabsorption, substances reabsorbed, glucose, urea, amino acids, chlorides, H ions etc.
5. Properties and composition of normal urine, urine output. Names & Abnormal constituents in urine, Micturition, Cystourethrogram.
6. Diuretics, Renal Function Tests
7. Actions of ADH, aldosterone, PTH on kidneys.

9. REPRODUCTIVE SYSTEM (6 hrs):

1. Functions of Reproductive system in male and female.
2. Semen secretion, composition, factors influencing, abnormalities, Oligozoospermia.
3. Ovulation, Menstrual cycle, Menstrual Fluid.
4. Pregnancy, Pregnancy tests.
5. Lactation – factors affecting- composition of breast milk.

10. Muscle & Nerve Chapter - Included

PRACTICALS

Study of Microscope and its uses
Collection of blood and study of haemocytometry
Haemoglobinometry
Determination of specific gravity of blood
White Blood Cell Count
Red Blood Cell Count
Determination of Blood Groups
Leishman's staining and differential WBC count
Determination of Erythrocyte Sedimentation Rate
Determination of packed cell volume
Calculation of Blood Indices
Fragility Test for R.B.C
Determination of Bleeding Time
Determination of Clotting Time
Blood Pressure Recording
Examination of arterial pulse - included
Artificial Respiration
Determination of Vital Capacity

References:

1. Text book of Physiology for BDS students by Dr. Jain
2. Text book of Physiology for BDS students by Dr. Sambulingam

1st Year

PAPER – 4 Clinical Laboratory Practices

1.	Laboratory Services	:	levels of laboratories – Primary level, Secondary level and tertiary level. Reference laboratories, Research laboratories and specific disease reference laboratories.
2.	Infrastructure in the laboratories.		
	a) Laboratory space	:	Reception, specimen collection, quality water supply, power supply, work area, specimen / sample / slide storage, cold storage, record room, wash room, biomedical waste room, fire safety, etc.
	b) Personnel in the laboratory	:	Qualifications as per NABL document.
	c) Equipment	:	Listing, cleaning, maintenance, SOP, verification of performance : Internal quality control.
	d) Reagents and materials	:	Purchase, maintenance, storage, use.
3.	Specimen Collection, storage and Transport	:	General guidelines of collection, labeling, handling, transportation storage of specimens. Care in handling specimens. Accession list, Worksheet, Reporting test results, Specimen rejection record, Recording of Laboratory data, Maintenance of records.
4.	Standard operating Procedure	:	Definition, format, text of SOP, types of SOP.

5.	Safety in Laboratories	:	General safety measures, biosafety precautions, levels of biosafety laboratories: BSL1, BSL2, BSL3, BSL4.
6.	Ethical considerations	:	Non – maleficence, beneficence, risk minimization,institutional arrangement, ethical review, transmission of ethical values, voluntariness, compliance.
7.	Quality assurance	:	Internal and external quality assessment.

8. Bio waste management.

9. Accidents and emergencies in the laboratory.

Practicals:-

1. Writing SOP of equipment maintenance, practical procedures done in the laboratory
2. Internal / External quality control
3. Sample collection, labeling, storage, transportation
4. Biowaste management
5. Biosafety

References: -

1. ICMR (2008) guidelines for good clinical laboratory practices.

2.	Hospital waste Management	:	Chapter 13. Park's Text Book of Preventive and Social Medicine; 18th Ed.
3.	NIH	:	DAIDS guidelines for Good Clinical Laboratory Practice Standards; 2011.
4.	WHO	:	Good Clinical Laboratory Practice (GCLP), 2009.

2nd YEAR

B.Sc (MLT)

SYLLABUS

2nd Year
PAPER – 1
PATHOLOGY – I (Theory)

THEORY:

1. HISTOPATHOLOGY:

1. Introduction to Histopathology:
2. Structure and functions of normal cell
3. Reception of specimens
4. Various fixatives – Mode of action, Indications, Preparation.
5. Grossing techniques
6. Steps of tissue processing and embedding.

2. HAEMATOLOGY :

1. Bone Marrow
   a) Techniques of aspiration, preparation and staining of films
   b) Bone marrow biopsy.

3. CYTOLOGY:

Techniques of collection of samples

i) Exfoliative cytology - **deleted** ii) Interventional cytology

i) Exfoliative Cytology:

Female Genital tract, Anatomy, structure and Physiology of female genital tract and Ovarian hormones, Techniques of collection of sample.

Pap Smears:

a) Lateral Vaginal wall smears
b) Vaginal 'pool' or 'vault' smears
c) Cervical smears
d) Combined (fast) smears
e) Triple smears (cervical-vaginal-endocervical smears)
f) Endocervical and endometrial smears.

i) Respiratory Tract
   Selection of material and making smears.
   Bronchial Aspiration (Washings) and Bronchial Brushing..
ii) Urinary Tract:

Collection and preparation of samples
Urinary sediment Cytology
Bladder Irrigation (Washings) Cytology
Prostatic massage – Cytology

iii) Body Fluids:
   a) Effusions in body cavities; and
   b) Fluids of small volume.
      i) Effusions – Ascitic, pleural etc.
      ii) Cerebrospinal Fluid (CSF)
      Normal CSF, CSF in non-neoplastic & neoplastic diseases

iv) Fixation and Fixatives in Cytology:
   a) Routine Fixatives
   b) Coating Fixatives
   c) Special purpose fixatives
   d) Preservation on fluid samples

v) Processing of samples in the Laboratory.

vi) Staining of smears:
   a) Papanicolou's stain
   b) H & E stain.
   c) Romanowsky stains like Leishman's, May Grunwald-Giemsa (MGG) and Wright's stains.

ii) Interventional Cytology:
a) Fine Needle Cytology
b) Imprint cytology
c) Crush smear cytology
d) Biopsy sediment cytology

4. CLINICAL PATHOLOGY:
1) Urine examination. Physical, Chemical and Microscopic examination.
2) Examination of faeces for occult blood
3) Examination of body fluids, cell counts.
4) Semen analysis
5) Sputum examination

5. INSTRUMENTATION:

1. Microscope
2. Balances
3. Tissue weighing machines
4. Tissue Processor
5. Microtomes ,Knives
6. Knife sharpener
7. Automatic slide stainer - **deleted**
8. Instruments for grossing
9. Electric saw

PRACTICALS

1. HISTOPATHOLOGY:

Processing, Embedding, preparation of blocks, Section cutting, use and care of Microtome and Microtome knives and H & E staining.

2. CYTOLOGY:

Preparation of reagents, Wet film preparation, Fixation, staining (H&E, 'Pap', MGG and Shorr) of vaginal smears, cervical smears and sputum. FNAC (Fine Needle Aspiration Cytology) - preparation of smears and staining.

3. CLINICAL PATHOLOGY:

Complete Urine Analysis
Cavity Fluids and miscellaneous samples
Cerebrospinal Fluid in Health & Disease
Semen analysis
Stool examination for Occult blood

4. HAEMATOLOGY

Complete Haemogram
Bone marrow smears - staining and examination

5. MOUNTING OF MUSEUM SPECIMENS:

1. Routine mounting of specimens
2. Mounting in glass jars.
3. special methods of mounting

Reference Books in Pathology:

Sl. No	Pathology books	Year of publication	Authors name	Publisher name
1	Histopathology Techniques	1974	C.F.A. Culling	Butter Worth
2	Lab Techniques WHO Manual Bio-Safety	2003	W.H.O.	W.H.O
3	Exfoliative Cytology Hand Book	1985	English M.c.Lure	Lippincott
4	Clinical Diagnosis in lab methods	1984	Todd & Sanford	Book Saunders
5	Hand book of pathology	2005	Harsh Mohan	Anshan
6	Practical Hematology	1984	Lewis & Davis	Churchill living stone
7	Histological Techniques	1982	Bancroft	Churchill living stone

2nd Year
PAPER – 2
MICROBIOLOGY – I (Theory)

GENERAL BACTERIOLOGY:

1. Historical Aspects
2. Structure of bacterial cell, growth and nutrition of bacteria
3. Bacterial metabolism, Bacterial genetics, Antibiotics & Drug resistance
4. Sterilization – Physical and Chemical methods, Antiseptics & Disinfectants.

IMMUNOLOGY:

1. Infection – Types, Sources, Modes of transmission, Pathogen and virulence of bacteria
2. Immunity: Types of Immunity
3. Antigens, Antibodies- Immuno globulins
4. Antigen - Antibody Reactions: Precipitation, Agglutination, Immuno fluorescence, Immuno enzyme assays, Radio Immuno assay, Complement and complement fixation
5. Immune system and Immune response, Auto immunity – Basic concepts
6. Immunodeficiency & transplantation immunology – Basic concepts.

SYSTEMIC BACTERIOLOGY:

1. Cocci (Gram positive & Gram negative) Staphylococci, Streptococci, Neisseria.
2. Gram-positive Bacilli : Anthrax, Diphtheria, and Clostridia.
3. Mycobacteria : Tuberculosis and Leprosy.
4. Gram Negative Bacilli : Enterobacteriaceae, Vibrios, Brucella, Bordetella, Haemophilus, Pasteurulla, Non-sporing anaerobic bacteria.
5. Spirochaetes : Leptospira, Borrelia and Treponema.
6. Bacterial Infections And Diagnosis:
    a. Wound infection, Postoperative infection
    b. Urinary tract infection
    c. Respiratory tract infection
    d. Diarrhoeas and food poisoning
    e. Infections of CNS
    f. Hospital acquired infections.

PRACTICALS

1. Microscopes – Types and Operation.
2. Study of Morphology of Bacteria:
    1. Unstained – Hanging drop preparation
    2. Stains: Simple staining, Gram staining, Ziehl Neelsens's staining.
    3. Staining for capsule.
    4. Culture media: Types and uses.
    5. Inoculation methods.
    6. Anaerobic culture methods
    7. Antibiotic sensitivity methods.
    8. Biochemical reactions in identification of bacteria.
    9. Isolation and identification of bacteria from various clinical specimens.
3. Agglutation Tests: Slide & Tube, Widal.
4. Latex agglutination : RF, ASO, CRP
5. Precipitation: VDRL test.
6. Common Skin Tests: Tuberculin.
7. Bacteriological Examination : Water, Milk and Air
8. Processing and reporting of swabs received from operation theatre.

RECOMMENDED BOOKS: (For 2nd & 3rd Year):

1. Text book of Microbiology, Baweja 2002 Vikas
2. Text book of Microbiology, Satish Gupta, 2004 Jaypee
3. Medical Lab Technology, Dr.Raghavendra Rao
4. Medical Lab Technology, Sood, 1999 Jaypee

REFERENCE BOOKS:

1. Textbook of Microbiology: Anantha Narayan & Jayaram Panicker.
2. Medical Mycology: Jagadish Chandra.
3. Parasitology: S.C. Parija.

2nd Year
PAPER – 3
BIOCHEMISTRY – I (Theory)

THEORY:

1. Introduction to apparatus, Chemical balance, principles and practice
2. Concepts of Molecular weight, Atomic Weight, Normality, Molarity, Standards, Atomic structure, Valency, Acids, Bases, and Salts.
3. Concepts of Acid Base Reaction and Hydrogen Ion Concentration.
4. Principles of photometry and spectrophotometry, laws of absorption, wavelength, turbidimetry, calibration, transmittance, absorption, standard, blank, Beer's law.
5. Flame photometry and Atomic absorption Spectrophotometry.
6. Carbohydrates chemistry – Reactions of Carbohydrates, metabolism of glucose – Glucose Tolerance Test – Normal and Diabetic patterns.
7. Chemistry of Proteins, Fats and Nucleic Acids.
8. Non-protein nitrogenous compounds: urea, creatinine and uric acid formation, significance and tests. Renal clearance tests, concentration and dilution tests.

PRACTICALS

a) Introduction to apparatus, instruments and use of chemical balance.
b) Preparation of normal solutions, molar solutions, percent solutions and reagents, dilution techniques.
c) Maintenance of Laboratory, Glassware and Apparatus.
d) Titration of simple acids and bases, measurement of hydrogen ion concentration - **deleted**
e) Practical aspects of Photometry, factors affecting wavelength: calibration and care of cuvettes. Reagent blank absorption curve, calibration curve, deviations of Beer's law.
f) Identification of sugars by qualitative tests; quantitative method for blood glucose estimation, qualitative screening test for urine glucose (Strip tests), qualitative test for reducing substances in urine.
g) Non protein nitrogenous compounds: determination of blood urea, ammonia, uric acid, creatinine. Creatinine clearance.

BOOKS:

1. Text book of Bio-chemistry - Debajyothi Das
2. Essentials of Biochemistry by U.Satyanarayana.
3. Varley's Clinical Chemistry-IV Edition.
4. Clinical Chemistry -Teitz

3rd Year

B.Sc(MLT)

SYLLABUS

3rd Year
PAPER – 1
PATHOLOGY – II

THEORY

1.HISTOPATHOLOGY:

1. Section cutting.
2. Mode of preparation and theory of H (Haematoxylin) & E (Eosin) staining
3. Various aspects of mounting and staining the slides
4. Theory of decalcification and various methods
5. Use of Microscopes – Light Microscope, Polarising Microscope
6. Phase contrast Microscope and Fluorescent Microscope.

2.INTRODUCTION OF THE FOLLOWING:

1. Flow and Imaging cytometry
2. Tissue Culture - **Excluded**
3. Cytogenetics

3. IMMUNO HISTOCHEMISTRY:

1. Introduction.
2. Overview of Immuno histochemistry.
3. Applications of Immuno histochemistry.

4. IMMUNOCYTOCHEMISTRY:

1. Introduction.
2. Basic concepts of Immunochemistry
3. PAP Technique – principle, preparation of reagents and procedure.
4. Immunocytochemical methods (immunoperoxidase and immunoalkaline phosphatase etc).

5. SPECIAL STAINS:

1. Mucicarmine
2. P.A.S.
3. Sudan Black
4. Oil Red “O”
5. Alcian Blue
6. Congo Red
7. Verhoeff’s stain for Elastic tissue
8. Mallory’s Phosphotungstic Acid Hematoxylin stain (PTAH)
9. Connective tissue stains.

1) Van Gieson stain 2) Masson's Trichrome Technique

10. AFB Staining –(for tissue sections of Tuberculosis and Leprosy)

6. FROZEN SECTIONS AND CRYOSTAT:

Frozen Sections:

a) Freezing Microtome.
b) Frozen Section Technique.

Cryostat:

a) Types
b) Operation of Cryostat
c) Cryostat Cut Sections.

***7.* HEMORRHAGIC DISORDERS**:-

1. Mechanism of coagulation
2. Collection and anticoagulants used in coagulation studies.
3. Bleeding time and clotting time.
4. Other coagulation studies PT, KPTT, TGT, etc.,
5. Platelet count.
6. Platelet function tests.

***8.* BLOOD TRANSFUSION AND IMMUNOHAEMATOLOGY** :-

1. ABO Blood Group System.
2. Rh typing and weaker variants in Rh system.
3. Subgroups and weaker variants of A and B: Bombay Phenotype.
4. Coombs' test.
5. Blood grouping and cross matching in blood bank.
6. Investigations of transfusion reactions.
7. Care and selection of donors.
8. Screening for Australia Antigen(Hbs Ag)
9. HLA Antigens and their significance in Blood transfusion.
10. Preservation of blood, principles and its application in blood banking.
11. Screening blood for infective material
12. Blood Bank Administration.

***9.* INSTRUMENTATION:**

1. Freezing Microtome.
2. Cryostat.
3. Automation in pathology (cell counters etc)
4. Application of Computers in Pathology.

10. HAEMATOLOGY

1) Blood collection
2) Anticoagulants used in Haematology
3) Normal values in Haematology
4) Basic Haematological Techniques
    a) RBC counts
    b) Haemoglobin estimation
    c) Packed cell volume
    d) Calculation of absolute indices, WBC counts-Total and differential
    e) Absolute eosinophil count
    f) Platelet count
    g) Erythrocyte sedimentation rate.
5) Preparation of blood films
6) Stains used in Haematology
7) Morphology of red cells
8) Morphology of leucocytes and platelets
10) Preparation of buffy coat smears
11) Reticulocyte count
12) Laboratory methods used in the investigation of deficiency anaemias
    a) B_{12} and Folate assay
    b) Schilling test
    c) Serum iron and iron binding capacity (procedure not required: only application required).
13) Laboratory methods used in investigation of haemolytic anaemias
    a) Osmotic fragility
    b) Test for sickling
    c) Estimation of Hb-F, Hb A_2

14) Organization and quality control in haematology laboratory
15) Preparation of glass ware

11. MUSEUM TECHNIQUES:

Preparation of specimens for mounting, methods of mounting, preparation of mounting solutions and colour maintenance

PRACTICALS

Hisopathological Exercises:- Special Stains:

1. Mucicarmine.
2. P.A.S.
3. Sudan Black
4. Oil Red 'O'
5. Schmorl's reaction.
6. DOPA
7. Alcian Blue
8. Congo Red
9. Verhoeff's stain for Elastic tissue.
10. Mallory's phosphotungstic Acid Hematoxylin stain (PTAH)
11. Connective tissue stains.
    1) Van Gieson stain 2) Masson's Trichrome Technique
12. Luxol Fast Blue Stain.
13. AFB Staining –(for tissue sections of Tuberculosis and Leprosy)

Cytological Exercise:-

Sex Chromatin: Buccal Smear Examination.

Haematological Exercises:-

1. L.E.Cells.
2. Bleeding profile
3. Blood groups.
4. Fever profile

REFERENCE BOOKS:

1) Clinical Diagnosis & Laboratory methods by Todd & Sanford.
2) Histopathology Techniques by Culling.
3) Histopathology Techniques by Bancroft.
4) Aspiration Biopsy cytology by Tilde Kline.
5) Cytology by Koss.
6) Practical Haematology by Davis & Lewis.
7) 50 Diagnostic special stains for Surgical Pathology by Erwin Haaf.
8) Text Book of Pathology by Harsh Mohan
9) Lab Techniques WHO Manual.
10) Exfoliative Cytology

3rd Year
PAPER - 2
MICROBIOLOGY – II

THEORY

1. VIROLOGY

General properties, classification and list of viruses -

RNA Viruses: Poliomyelitis, Coxsackie viruses, Rhino viruses, Influenza, Rabies, Arboviruses, Measles, Mumps, Rubella, HIV, Rotavirus.

DNA Viruses: Smallpox, Herpes simplex, Varicella Zoster, CMV, EBV, Adenoviruses, Hepatitis Viruses.

2. MYCOLOGY:

Introduction about Fungi. Names of the fungi and the diseases caused by them. Superficial mycoses, Candida, dermatophytes, opportunistic fungi, subcutaneous mycoses, Cryptococcus.

3. PARASITOLOGY:

- Introduction & Classification
- Names of the parasites

Protozoology: Entamoeba histolytica, Trichomonas vaginalis, Giardia lamblia, Hemoflagellates (in brief), Malarial Parasites, Opportunistic protozoan infections in AIDS.

Cestodes: D.latum, E.granulosus, T.saginata, T.solium, H.nana, H.diminuta.

Nematodes: Ascaris lumbricoides, Ancylostoma duodenale, Necator americanus, Strongyloides stercoralis, Trichuris trichiura, Enterobius vermicularis, Dracuriculus Medinensis, Wuchereria boncrofti.

PRACTICALS

1. VIROLOGY:

1. Latex agglutination
2. Tests for HIV, HBs Ag

2. MYCOLOGY:

Preparation, identification and interpretation of samples from skin, hair and nail, sputum, vaginal secretions, oral secretions.

3. PARASITOLGY:

1. Microscopic examination of faeces
2. Saline, iodine preparation
3. Concentration methods for faeces examination.
4. Blood smear and staining for haemoflagellates, malarial and filarial parasites.

3rd Year
PAPER – 3
BIOCHEMISTRY – II

THEORY

I) Enzyme definition, classification, coenzymes, cofactors and inhibitors affecting enzyme activity, units of measurement, Isoenzymes, Normal values of different serum enzymes and their variation in diseases.

II) Proteins - Chemistry, structure, plasma protein concentration and biochemical changes in disease, fractionation techniques, interpretation. Principles of Electrophoresis and Chromatography.

III) Lipids - Chemistry of fatty acids, triglycerides, Cholesterol, Phospholipids, serum Lipoprotein pattern – normal and alterations in disease.

IV) Inorganic Ions.
Concepts of inorganic ions – Bicarbonate, phosphate, calcium, sodium and potassium and trace elements.

V) Sample collection, Preservation and preparation of protein free filtrates - Theoretical aspects.

VI) Liver function tests.

VII) Gastric Analysis.
Composition of gastric juice, concepts of free and bound acid, Gastric stimulants.

VIII) Accuracy, precision, quality control, error in laboratory tests, quality control charts. Normal values
Statistics – classification of observations, frequency distribution, definition of terms – deleted.

IX. Blood gases, bicarbonate buffering system. Henderson Hasselbach reaction, Blood pH, pCO_2 – calculations, normograms.

X. Calculi formation.

XI. Automation, Micro techniques - Theory.
Ultra micro techniques - deleted

PRACTICALS

I. Proteins: Determination of total protein in Serum plasma, CSF and Urine, Determination of Albumin, Globulin and Fibrinogen, Electrophoretic separation of proteins.

II. Lipids: determination of serum lipids, cholesterol ester, triglycerides and lipoprotein fractionation.

III. Inorganic Ions, Determination of calcium in serum and urine, serum phosphates, iron, copper, chloride, sodium, and potassium.
IV. Sample collection, preservation and preparation of protein free filtrate.
V. Enzymes: Simple enzymatic reaction, demonstration of factors affecting enzyme action, determination of Acid and Alkaline Phosphatases, LDH., SGOT, SGPT, Amylase - Salivary and Pancreatic, determination of LDH Iso enzymes
VI. Estimation of Bilirubin-total and conjugated, urobilinogen, Urobilin and Bile Acids.
VII. Gastric analysis. Determination of free and total acid, gastric stimulation. Specimen collection.
VIII. Accuracy, precision, and quality control. Demonstration and preparation of quality control sera. Comparison of two methods. F. Test and Bartels test. Normal values.
IX. Isotope and ELISA techniques for determination of CEA, AFP, T3, T4, TSH and HCG
X. Laboratory methods used in the investigation of deficiency anaemias
    i. B_{12} and Folate assay
    ii. Serum iron and iron binding capacity
XI. Automation, micro and ultramicro techniques.

REFERENCE BOOKS:

1) Text book of Biochemistry - Debajyotidas.
2) Essentials of Biochemistry by U.Satynarayana
3) Varley's Clinical Chemistry-IV Edition.
4) Clinical Chemistry - Teitz.
5) Clinical Chemistry - Kaplan.

III. ANTIRAGGING ACT:

THE ANDHRA PRADESH GAZETTE

PART-IV.B. EXTRAORDINARY
PUBLISHED BY AUTHORITY

No.36] HYDERABAD, THURSDAY, AUGUST 21, 1997

ANDHRA PRADESH ACTS, ORDINANCES AND REGULATIONS Etc.

The following Act of the Andhra Pradesh Legislative Assembly received the assent of the Governor on the 19th August, 1997 and the said assent is hereby first published on the 21 at August, 1997 in the Andhra Pradesh Gazette for general information.

ACT No. 26 of 1997

AN ACT TO PROHIBIT RAGGING IN EDUCTIONAL INSTITUTIONS IN THE STATE OF ANDHRA PRADESH.

Be it enacted by the Legislative Assembly of the State of Andhra Pradesh in the Forty-eighth of India, as follows:-

1. (1) This Act may be called the Andhra Pradesh Prohibition of Ragging Act, 1997. (2) It extends to the whole of the State of Andhra Pradesh. (3) It shall be deemed to have come into force with effect from 4th July.	Short title, extent and commencement
2. In this act, unless the context otherwise requires:- a) 'act' includes words either spoken or written or signs or sounds or gestures of visible representations; b) 'Educational Institution' means and includes a college, or other institution by whatever name called, carrying on the activity or imparting education therein (either exclusively or among other activities); and includes an orphanage or boarding home or hostel or authorial institution or any other premises attached thereto.	Definitions.

c) 'Government' means the State Government of Andhra Pradesh. d) 'notification' means the notification published in the Andhra Pradesh Gazette and the word 'notified' shall be construed accordingly; e) 'ragging' means doing an act which causes 'or is likely' to cause insult or annoyance of fear or apprehension or threat or intimidation or outrage of modesty' or injury to a student. f) 'student' means a person who is admitted to an educational institution. And whose name is lawfully borne on the attendance register thereof; g) All words and expressions used but not defined in this Act shall have the meanings assigned to them under the Andhra Pradesh Education Act, 1982 or Indian Penal Code, 1660 respectively.	A.P. Act 1 of 1982 Central Act 45 of 1860.
3. Ragging within or outside any educational institution is prohibited.	Prohibition of Ragging.
4.Whoever, with the intention of causing ragging or with the knowledge that he is likely by such act to cause ragging, commits or abets ragging and thereby. Teases or embarrasses or humiliates a student shall be punished with imprisonment for a term which may extend to six months or with fine which may extend to one thousand rupees or with both; Or Assaults or uses criminal force to or criminally intimidates, a student shall be punished with imprisonment for a term 'which' may extend to one year or with fine which may extend to two thousand rupees or with both; Or	Penalty for Ragging.

wrongfully restrains or wrong fully confines or causes hurt to a student shall be punished with imprisonment for a term which may extend to two years or with fine which may extend to five thousand rupees or with both; Or causes grievous hurt to or kidnaps or abducts of rapes or commits unnatural offence with a student shall be punished with imprisonment for a term 'which 'may extent to five years and with fine which may extend to ten thousand rupees; Or causes death of abets suicide shall be punished with imprisonment for life with imprisonment for a term which may extend to ten years and with a fine which may extend to fifty thousand rupees.	
5. (1) A student convicted of an offence under section 4 and punished with imprisonment for a team shall be dismissed from the educational institution. (2) A student convicted of an offence under section 4 and punished with imprisonment for a team of more than six months shall not be admitted in any other educational institution.	Dismissal of student.
6. (1) Without prejudice to the fore going provisions, whenever any student complains of ragging to the head or manager of an educational institution, such head or manager shall inquire into or cause an inquiry to be made into the same forthwith and if the complaint is prima-facie found true, shall Suspend' the student or students complained against for such period as may be deemed necessary. (2) The decision of the head or manager of the educational institution under sub section (1) shall be final.	Suspension of student.

7. (1) If the head or the manager of an educational institution fails or neglects to take action in the manner specified in sub-section (1) of section 6, such person shall be deemed to have abetted the offence and shall be punished with the punishment provided for the offence. (2) If a student commits suicide due to or in consequence of ragging, the person who commits such ragging shall be deemed to have abetted such suicide.	Abetment.
8. The provisions of this Act shall be in addition to and not derogatory of any law for the time being in force	Other laws not affected.
9. (1) The Government may by notification, make rules for carrying out all or any of the purposes of this Act. (2) Every rule made under this Act shall immediately after it is made, be laid before the Legislative Assembly of the State, if it is in session and if it is not in session, in the session immediately following for a total period of fourteen days which may be comprised in one session or in two successive sessions, and if, before the expiration of the session in which it is so laid or the session 'immediately following the Legislative Assembly agrees in making any modification in the rule or in the annulment of the rule, the rule shall, from the date on which the modification or annulment is notified, have effect only in such modified form or shall stand annulled as the case may be so, however, that any such modification or annulment shall be without prejudice to the validity of anything previously done under that rule.	Power to make rules.
10. The Andhra Pradesh Prohibition of Ragging Ordinance, 1997 is hereby Repealed.	Repeal of ordinance 12 of 1997.

G.BHAVANI PRASAD,
Secretary to Government,
Legislative Affairs & Justice,
Law Department.

FUNDAMENTAL DUTIES OF INDIAN CITIZENS
as given under
ARTICLE 51 (A) OF THE INDIAN CONSTITUTION

1. To abide by the Constitution and respect its ideals and institutions, the National Flag and the National Anthem;
2. To cherish and follow the noble ideals which inspired our national struggle for freedom;
3. To uphold and protect the sovereignty, unity and integrity of India;
4. To defend the country and render national service when called upon to do so;
5. To promote harmony and the sprit of common brotherhood amongst all the people of India transcending religious, linguistic, regional or sectional diversities; to renounce practices derogatory to the dignity of women;
6. To value and preserve the rich heritage of our composite culture;
7. To protect and improve the natural environment including forests, lakes, rivers and wild life and to have compassion for living creatures;
8. To develop the scientific temper, humanism and the spirit of inquiry and reform;
9. To safeguard public property and to abjure violence;
10. To strive towards excellence in all spheres of individual and collective activity so that the nation constantly rises to higher levels of endeavour and achievement.