

Post Graduate Diploma in
Medical Laboratory Technology
Examination- 2007

Prospectus No.071421

संत गाडगे बाबा अमरावती विद्यापीठ

SANT GADGE BABA AMRAVATI UNIVERSITY

आयुर्विज्ञान विद्याशाखा

(FACULTY OF MEDICINE)

**PROSPECTUS
OF**

**The Examination for the Post Graduate Diploma in
Medical Laboratory Technology
(2006-2007)**



2006

PUBLISHED BY

Registrar
Sant Gadge Baba Amravati University,
Amravati 444 602

(Price Rs. /-)

(visit us at www.amtuni.com)

SANT GADGE BABA AMRAVATI UNIVERSITY, AMRAVATI

* ORDINANCE NO. 11 OF 2003

EXAMINATION LEADING TO THE POST GRADUATE DIPLOMA IN MEDICAL LABORATORY TECHNOLOGY, ORDINANCE 2003.

Whereas it is expedient to provide an ordinance leading to the Post Graduate Diploma in Medical Laboratory Technology the Management Council is hereby pleased to make the following ordinance:-

1. This Ordinance may be called “ Examination leading to the Post Graduate Diploma in Medical Laboratory Technology Ordinance 2003.
2. This Ordinance shall come into force w.e.f. the date of its approval by the Management Council.
3. The examination leading to the Post Graduate Diploma in Medical Laboratory Technology shall be held twice a year at such places and on such dates as may be appointed by the Boards of Examination.
4. The duration of this course shall be one academic year.
5. Subject to his compliance with the provisions of this Ordinance and of any other ordinances in force from time to time and applicant for admission to the Post Graduate Diploma in Medical Laboratory Technology Examination shall have :
 - a. passed the B.Sc.degree of this University or of any other university recognized as equivalent thereto, with following subjects.
 - (1) Chemistry and
 - (2) Any Two of the following subjects as principal life science subjects.
 - i. Botany
 - ii. Zoology
 - iii. Microbiology
 - iv. Biochemistry
 - v. Biological Techniques and Specimen Preparation.
 - vi. Biotechnology
 - vii. Industrial fish and fisheries
 - viii. food science

or have passed B.A.M.S., B.H.M.S., B.Pharm., B.D.S. or M.B.B.S. degree courses.
 - & b. attended a regular full time course of study for a period of not less than two academic terms (one academic year) in the subjects of Human Pathology, Medical Microbiology and Medical Biochemistry in a Medical Council of India recognised Medical College only.
6. Without prejudice to the other provisions of ordinance No. 6, relating to the Examinations in General, the provisions of paragraphs 5,8 10 and 32 of the said ordinance shall apply to every collegiate candidate.
7. The fee for the examination shall be as prescribed and notified by the University.
8. A. The examination shall consist of written papers, practical and viva-voce.
B. Question papers for the examination shall be set in English.
C. The medium of instruction for the course of studies and of the Examination shall be English.
9. The examination for the Post Graduate Diploma in Medical Laboratory Technology shall consist of the following subjects :
 1. Pathology
 2. Microbiology .
 3. Biochemistry
10. The scope of the subjects shall be as indicated in the syllabus.
11. The maximum marks for each paper and for practicals and the minimum aggregate marks which an examinee must obtain in order to pass the examinations shall be as indicated in Appendix to this ordinance.
12. Provisions of Ordinance No. 18 of 2001 relating to An Ordinance to provide grace marks for passing in a Head of passing and Improvement of Division (Higher class) and getting Distinction in the subject and Condonation of deficiency of marks in a subject in all the faculties prescribed by the Statute No. 18, Ordinance, 2001 shall apply to the examination under this ordinance.

13. For eligibility to appear for the examination, minimum required attendance shall be 75% in theory & practicals separately in each subject.
14. In order to be successful at the examination, an examinee shall obtain 50 % of the total marks in each theory and practical separately and simultaneously.
15. A successful examinee passing the Post Graduate Diploma in Medical Laboratory Technology Examination within the minimum prescribed period obtaining not less than 75 % of total marks prescribed for the examination shall be declared to have passed the examination with Honours. The names of examinees passing the Post Graduate Diploma in Medical Laboratory Technology Examination in the minimum prescribed period with Honours shall be published in Order of Merit.
16. Subject to his compliance with the provisions of this Ordinance and of other Ordinances in force from time to time an examinee who is unsuccessful at the examination may be readmitted to the subsequent examination on payment of a fresh fee and such other fees as may be prescribed.
17. An unsuccessful examinee on his/her readmission to the examination shall appear only in the subjects in which he/she has failed.

(explanation - An examinee, on readmission to an examination under this ordinance shall be examined in the subject as a whole and not in a part thereof).
18. As soon as possible after the examination, the Board of Examinations shall publish a list of successful examinees.
19. Notwithstanding anything to the contrary in this Ordinance, no person shall be admitted to an examination under this Ordinance, if he has already passed the same examination or an equivalent examination of any other Statutory University.
20. Examinees successful at the Post Graduate Diploma in Medical Laboratory Technology Examination shall be entitled to receive Post Graduate Diploma in the prescribed form signed by the Vice-Chancellor.

4
APPENDIX
THE POST-GRADUATE DIPLOMA IN MEDICAL LABORATORY
TECHNOLOGY EXAMINATION

Sr. No.	Subject	Details	Maximum Marks	Minimum marks required to pass in each part of subject.	Minimum Marks required to pass in each subject.
1.	Pathology	Theory- Paper I - Paper II	100 } 100 }	100 } 50 }	150
		Practicals	100		
2.	Microbiology	Theory	100	50 } 50 }	100
		Practicals	100		
3.	Biochemistry	Theory	100	50 } 50 }	100
		Practicals	100		

I. Practical And Viva-Voce : Three Practicals :

Pathology Practicals:		Marks
1. Spotting	:	10
2. Exercises	a) Clin. Path. – Urine/Semen (any one)	: 10
	b) Haematology – Hb/PS/TLC-DLC/ Sickling/CBC (any one)	: 10
	c) Blood Banking – Blood group/Rh Cross Matching/ABO titre/coombs test.	: 10
	d) Histopath Paraffin embedding / section cutting/ Staining (H & E)/Block making.	: 10
	e) Museum Techniques Preparation of mounted Specimen/ Sealing/Display.	: 05
	f) Cytology Fluid Cytology/PAP Smear/FNAC/Sputum	: 10
3. Journal	:	05
4. Oral – Viva Voce	:	30
Total Marks		: 100

II. Microbiology Practicals :

1. (a) Inoculation of specimen on media	:	10
(b) Preparation of smear and staining (Albert or Ziehl Neelson or Special Stain)	:	10
2. Identification of bacteria from Pure Culture :		
(a) Gram/suitable staining from pure culture	:	05
(b) Rapid/other tests from pure culture for identification of bacteria.	:	10
(c) Antimicrobiological drug sensitivity test from pure culture.	:	05
3. (a) Serology/ Immunological Test.	:	10
(b) Stool Examination.	:	10
4. (a) Spotting (Ten)	:	10
(b) Media Pouring/ Ph adjustment.	:	05
(c) Journal	:	05
5. Oral and Viva-Voce	:	20
Total Marks		: 100

III. Biochemistry Practicals:

1. Spotting	:	10
2. Exercises:	(a) Estimation of Glucose/Urea/ Creatinine/Cholesterol/Proteins/ (any one).	: 15
	(b) Estimation of SGOT/SGPT/ Acid & ALK.Phosphatase/ Amylase/ Calcium/Uric acid/ Bilirubin. (any one).	: 15
	(c) Preparation of Reagent & Adjustment of PH.	: 10
	(d) Flame photometry Estimation of Na/K/Cl/Li.	: 15
3. Journal	:	05
4. Oral- Viva-Voce	:	30
Total Marks		: 100

**SYLLABUS PRESCRIBED FOR
THE POST GRADUATE DIPLOMA IN MEDICAL LABORATORY TECHNOLOGY EXAMINATION
(To be effective from the Academic Session 2005-2006)**

Syllabus For Theory Examination for Pathology:

Paper-I : Clinical Pathology including Hematology.

- Unit-1 :** Methods of counting red cells, leukocytes and Platelets. Haemoglobin estimation. The use of Haematocrit. Calculation of absolute values. Detection of abnormal haemoglobin by paper cellogel electrophoresis. The detection of sickling. The detection of foetal haemoglobin. Automatic Blood cell counter.
- Unit-2 :** The function, development and identification of red cells, leukocytes, platelets and their precursors in health and diseases.
Preparation and staining of peripheral smears and bone-marrow smears, Techniques of demonstrating L.E. Cells, Supravital staining etc. Study of pathogenic blood parasites their morphology and identification methods.
- Unit-3 :** Methods of investigating bleeding disorders, i.e. bleeding and clotting time, prothrombin time, thromboplastin generation test, Other tests for coagulation disorders, Estimation of E.S.R.
- Unit-4 :** Methods of investigating haemolytic anaemia e.g. Osmotic fragility test, Coomb's test, Ham's acidified serum test.
Routine physical, Chemical and microscopic examination of urine.
Routine naked eye and microscopic examination of stool, study of common parasites, cysts and ova in stools, Chemical exam of stool, Stool concentration techniques. CSF examination, Body Fluids examination Seminal Fluid Analysis.
- Unit-5 :** Laboratory Management and planning, the reception and recording of specimen, cataloguing and indexing, Maintenance of Laboratory records of Clinical Pathology including Haematology.

The Use and Care of the following :-

Haemocytometers, Automatic Blood cell Counter. Hb electrophoresis Apparatus, haemoglobinometers, haematocrit tubes, wintrobe tubes, pipettes urinometer, centrifuges, Haematocrit centrifuge, simple glass manipulation.

Photography:- Techniques of Gross and Microphotography, Identification Marks, Maintenance, Laboratory Record Keeping:- Manual and Computerised Records.

**Paper-II: Histopathology blood transfusion techniques.
Cytology & Blood Banking**

- Unit-1 :** Fixation – Action of common fixing agents, Use of common Fixatives.
Decalcification-Methods in common use for decalcification.
Processing-Common methods of processing the tissues for paraffin sections. Histokinette, Microtome.
- Unit- 2 :** Cutting of paraffin sections and staining with Haemotoxylene and Eosin.
Frozen section techniques and preparation of cellodin sections.
- Unit- 3 :** Special staining techniques-As Masson's Trichrome, Reticulin, Amyloid, Automatic staining machine, P.A.S., Glycogen, Iron, Fat/stain, etc. Histochemical techniques.
Museum Methods- The preparation and presentation of specimens intending for display in a Medical museum.
The sealing of glass jars.
- Unit- 4 :** Knowledge of maintenance and working of refrigerators and blood storage cabinets, Incubators, Ovens, Autoclave , preparation and sterilization of Transfusion sets. Techniques of collection and storage of blood. Criteria for fitness for use of stored blood. Selection of blood donors. Complications of blood transfusion, venepuncture.
- Unit- 5 :** Theory including inheritance and nomenclature of the ABO and RH blood group systems, other blood groups. Techniques for the determination of the various blood groups. Selection and preparation of grouping sera, sources of errors in grouping and their elimination. Group sera titration, Coomb's Test.
A thorough knowledge of compatibility test is essential. Recognition and investigation of transfusion reaction. The Serological effects of incompatible transfusion (Transmission, The V.D.R.L. Test, Preparation and sterilization transfusion sets.)
The tests to detect transmitted diseases through blood, transfusion e.g. Syphilis (VDRL), Hepatitis B (Australia Antigen), H.I.V., H.C.V.
- Unit- 6 :** Blood & its components – Methods of separation of Blood components by different techniques. Blood component Laboratory. Preservation & Storage of Components, its transport.
Rational use of blood components. Organisation of blood donation camps.
Instruments for component laboratory & blood bank.
Socialised Blood Banking. Ethics in blood transfusion.
- Unit- 7 :** Cytology.
Basic principles in cytology. Branches of cytology- Exfoliative, Fluid/CSF, Imprint, FNAC, Non-FNAC. Specimen collection, preservation, fixation, staining, PAP, MGG, Giemsa, Gram, AFB, PAS, special stains, etc. Barr Body (Sex Chromatin) staining.
Special techniques-Immunocyto-chemistry.
Automated Cytology, Cytospin.
Special techniques- Sedimentation/floatation/etc.
Organisation of a cytology laboratory.
Maintenance of Laboratory records in Blood Bank, Histopathology Cytology.

Syllabus For Practical Examination For Pathology:**A] Clinical Pathology**

- 1] Introduction.
- 2] General Technology : (a) Glass-ware, (b) Reagents, (c) Instrumentation, (d) Specimen collection.
- 3] Urine examination: (a) Physical examination, (b) Chemical examination, (c) Microscopic examination.
- 4] Faeces examination: (a) Methods of preparing wet smears, (b) Physical examination, (c) Chemical examination, (d) Microscopic examination.
- 5] Sputum examination : (a) Gross examination, (b) Physical examination, (c) Chemical examination (d) Microscopic examination (e) Cytology.
- 6] Semen examination: (a) Gross examination, (b) Chemical examination, (c) Microscopic examination.
- 7] Cerebro Spinal Fluid : (a) Gross examination, (b) Chemical examination, (c) Microscopic examination, (d) V.D.R.L. Test.
- 8] Body Fluids : (a) Gross examination, (b) Chemical examination, (c) Microscopic examination, (d) V.D.R.L. Test.
- 9] Pregnancy Test: (a) Immunological test.

B] Haematology :

- 1] General Technology : (a) Glass-ware (b) Reagents (c) Instrumentation
- 2] Specimen Collection : (a) Different methods of collection (b) Types and uses of Anticoagulants.
- 3] Haemoglobin.
Technique, Normal values, Abnormal values, significance, Interpretation,
- 4] Red blood cells:
Technique, Normal Values, Abnormal Values, significance, Interpretation.
- 5] Haematocrit:
Technique, Normal Values, Abnormal Values, Significance, Interpretation.
- 6] Red Cell indices :
Methods, Normal Values, Abnormal Values, Significance, Interpretation.
- 7] Reticulocyte count and sickling Test:
Techniques, Significance, Interpretation.
- 8] Erythrocyte sedimentation rate :
Methods , Normal values, Abnormal Values, Significance.
- 9] White Blood Cells :
Total Count : (a) Techniques, Normal Values, Abnormal Values, Significance , Interpretation.
Differential Count : (a) Preparation and Staining methods for blood smear, (b) Method of Counting cells, (c) Identification of cells.
- 10] Platelets:
Techniques, Normal Values, Abnormal Values, Significance, Interpretation.
- 11] Bleeding Time, Clotting Time:
(a) Techniques, Normal Values, Abnormal Values, Significance, Interpretation,
(b) Clot Retraction time.
- 12] Prothrombine Time/PTTk (Partial Thromboplastin Time)
Techniques, Normal Values, Abnormal Values, Significance, Interpretation.
- 13] Absolute Eosinophil count :
Techniques, Significance.
- 14] Bone Marrow:
Demonstration of various types from smear examination.
- 15] Blood Transfusion Technique:
(a) Grouping: (i) ABO (ii) Rh.
(b) Cross Matching : (i) Saline (ii) Albumine (iii) Coomb's
(c) Antibody Titra : Techniques, Significance.

C] Histopathology/Cytology :

- 1] Principles of tissue processing: Fixation and fixatives and their uses. Methods of decalcification : Select on of tissue for processing.
- 2] Paraffin embedding methods : Dehydration, cleaning and impregnation, Vacuum embedding, Preparation of blocks.
- 3] Paraffin section cutting : Use of microtome and knives, Sharpening of knives-honing, stropping, automatic sharpeners. Difficulties in section cutting and fault finding, Mounting sections on slides.
- 4] Other methods of embedding : Celloiding, Gelation, Techniques of cutting frozen sections.
- 5] Theory of staining : Routine H & E staining, Special stains for paraffin and frozen sections, Elementary histochemistry.
- 6] Cytology techniques : Preparation of smears, fixation and staining, Papanicolaou staining and other stains for hormonal study and study of sex chromatin.
- 7] Museum methods : Preservation and display of specimens, Methods of mounting in jars, Museum indexing.

Books Recommended as Reference Books for Pathology :

- 1] Diagnosis & Management of diseases by – Todd/Sanford . Laboratory Methods.
- 2] Clinical Laboratory Methods by - John D. Bauer.
- 3] Manual of Histological Techniques and their diagnostic applications by – John D. Bancroft, Harry C. Cook.
- 4] Clinical Haematology – Degruchy.

- 5] Text book of Pathology – Part-I – General Pathology.
- Part-II- Special Pathology.
- By M.C.Dey & T.K. Dey.
- 6] Clinical Laboratory diagnosis by – Levinson SA & Mac Fate RP.
- 7] Handbook of Histological Techniques by – CFA Culling.
- 8] A Laboratory Manual for Rural Tropical Hospital – Part I & Part II by – Monica Cheeskrough.
- 9] Medical Laboratory Technology by – Chitra Bharucha, CMC Vellore.
- 10] Text book of Medical Laboratory Technology – by Dr. Ramnik Sood.
- 11] Practical Haematology by Decie.

Syllabus For Theory Examination for Microbiology:

Unit-1 : General Bacteriology.

- a. History and scope of microbiology. Bacterial classification, morphology and Physiology of bacteria. Normal Flora of human body.
- b. Sterilisation- Methods of sterilization and uses. Dry heat, moist heat, Filtration, Radiation, Ultraviolet light, chemicals and disinfectants.
- c. Microscopes- Care and use of microscopes, light microscope, phase contrast microscope, Dark field microscope, Electron microscope.
- d. Culture Media- Common Laboratory media for Bacteria, Fungi, mycobacteria and Anaerobic bacteria.
- e. Culture Methods- Streak, Lawn, stroke, stab, Pour plate and liquid cultures.
- f. Collection, transport, reception, labeling and processing of clinical specimen.
- g. Identification of pathogens from clinical specimen and common bacteriological staining techniques.
- h. Bacteriological examination of food and water.

Unit-2 : Systemic Bacteriology- Morphology, Disease produced and laboratory diagnosis of the following:

- a. Cocci-Staphylococci, Streptococci, Pneumococci, Gonococci, Meningococci.
- b. Gram negative bacteria- E.Coli, Klebsiella, Proteus, Salmonella, Shigella, Vibrio.
- c. Gram Positive Bacteria and Anaerobic organisms-corynebacterium diphtherae, clostridia and non-clastridial anaerobes.
- d. Mycobacteria- M.tuberculosis, Atypical mycobacteria, M.leprae.

Unit-3 : Serology.

- a. Antigen and Antibody.
- b. Antigen-Antibody reaction (Serological reactions), methods of performing agglutination, precipitation, complement fixation test, ELISA, RIA, VDRL, Widal, ASO, CRP, RF, HBSAg, RPR tests.

- Unit-4 :**
- a. Virology- Introduction, General properties of viruses, Cultivation of viruses, Different virological techniques.
 - b. Rickettsiae and common viral infections (Disease produced & lab diagnosis).
 - c. Mycology-Common pathogenic fungi, collection of sample, Inoculation and lab-diagnosis.
 - d. Parasitology- Introduction, common diseases produced by Protozoa, helminthes and lab diagnosis.

Unit-5 : Misslaneous.

- a. Biosafety Guidelines and prevention of laboratory acquired infections.
- b. Quality control and Quality Assurance programme.
- c. Material Management- Record Keeping, Purchases, indent, maintenance of stock registers.
- d. Laboratory Waste Management-Disposal of infected material & Culture Media.
- e. Preservation of culture and maintenance of stock culture.
Instruments- Knowledge, working and maintenance of laboratory instruments like incubator, Hot Air Oven, Autoclave, Refrigerator.
- f. Common Laboratory Animals- Care, Use, breeding of laboratory animals like Mice, Rat, Rabbit, G. Pig, Dog and Frog.

Syllabus For Practical Examination For Microbiology:

A) Practical cum demonstration:

1. Glassware :- Types, Cleaning, sterilization.
2. Preparation of sterile swab.
3. Sterilization and disinfecting of clinical specimens & laboratory equipments.
4. Microscope:- Types, principles, parts, function & care.
5. Different stainings :- Negative, Differential Staining, Spore, Flagellar, Capsule, Spirochetes, Metachromatic granules.
6. Preparation and stainings :- Gram stain, Z-N stain, Albert stain, special stain for demonstration of spore, flagella etc.
7. Cultivation of bacteria :- Inoculation, Incubation, Isolation, Identification and preservation of bacteria isolated from different clinical specimen.
8. Antimicrobial susceptibility testing. Preparation of antibiotic solution, Preparation of Discs, Media And Antitubercular drug seasitivity testing.
9. Stool Exam.:- Different Methods of Examination of ova, cyst and Preservation of stool.

B) Technical Skill proficiency program:

1. Professional Ethics and role of Technician in laboratory.
2. Basic principles of laboratory work, Biosafety, Precaution and First aid.
3. Collection, labeling, transport of specimen and Maintenance of Record.

4. Care & Maintenance of Laboratory instrument, Requirements, Purchase procedures, stock maintain & control.
5. Glassware: Types, Cleaning and sterilization of glassware, Preparation of sterile swabs.
6. Laboratory Media:-
 - a) Preparation of distilled water.
 - b) Cleaning and sterilization of glassware for Media.
 - c) Preparation & sterilization of Media and PH adjustment.
 - d) Preparation of special Media.
 - e) Making Pasteur pipette and swabs.
 - f) Disposal of used Media.
7. Routine Bacteriology:
 - a) Reception, labeling and Recording of clinical specimen.
 - b) Inoculation of Media, Incubation and reading of culture growth.
 - c) Biochemical tests and special tests.
 - d) Anaerobic bacteriology techniques.
8. Antimicrobial Sensitivity Testing:
 - a) Methods
 - b) Standardization
 - c) Media preparation
 - d) Preparation of antibiotic solution
 - e) Preparation of Discs
 - f) Interpretation of report
 - g) Antitubercular drug sensitivity.
9. Serology : Widal, VDRL, ELISA, ASO, Other immunological tests, HBS Ag, RF, CRP, RPR.
10. Mycology & Mycobacteriology.
 - a) Skin Scraping
 - b) Preparation of wet mount and culture of fungi
 - c) Sputum for AFB
 - d) Concentration of sputum
 - e) Culture of AFB
11. Stool Exam:
 - a) Routine examination of ova, Cyst.
 - b) Concentration method of ova and cyst.
 - c) Preservation of stool.

Books Recommended as Reference Books for Microbiology :

- 1] A Handbook of medical laboratory, Christian Medical College & Hospital, Vellore, Tamilnadu.
- 2] A new short textbook of Microbial and parasite infection.
B.I.Duorden, T.M.S. Roid, J.M. Jewsbury, D.C.Turh.
- 3] Laboratory Manual by Baker Silverton.
- 4] WHO Manual of Lab Technology.
- 5] Medical Lab Technology for Tropical Countries.
Vol. I & II by Monica Cheesborough.
- 6] Mackle and Mc Cartney
Practical Medical Microbiology Edited by : J.G. Collee/A.G.Fraser, B.P.Marmion/A Simmons (Fourtenth Edition).
- 7] Balley and Scotts Diagnostic Microbiology : Ellen Jo Boron Lance R. Peterson Sydney M. Finegold.
- 8] Medical Microbiology, A Guide to the Lab diagnosis and Control of infection 12th Edition Volume I. Microbial infections.
Robert Cruickshank, J.P.Deuguid, B.P.Marmion, R.H.A. Swain.
- 9] Essential of Medical Microbiology- Rajesh Bhatia, Ratan Lal Ichhpujami.
- 10] A Text Book of Microbiology by R.Anantnanarayan, C.K.Jayaram Panikkar.
- 11] A Text Book of Microbiology by P. Chakraborty.
- 12] A Text Book of Microbiology by C.P. Baveja.
- 13] Practical Microbiology by C.P. Baveja.

Syllabus For Theory Examination for Biochemistry:

- Unit-1 :** Anticoagulants, collection and preservation of Specimens.
General Osmotic pressure, types of valency, isotopes molar, normal and standard, PH buffer solutions, preservation of common solutions, Gravimetric, colorimetric and volumetric methods, Electrophoresis.
- Unit-2 :** Chemical examination of urine for protein, sugar, ketone bodies, blood, bile pigments and salts, urobilinogen, calcium, chloride etc.
Function Tests:- The instructions to the wards including the preparation of patient should be known.
LIVER FUNCTION TESTS:
Van Den Berg reaction, bilirubin, Serum protein Allumin, Globulin, alkaline Phosphatase, S.G.O.T., S.G.P.T. Thymol and Zine sulphate turbidity test, Serum Cholesterol, B.S.P. tests.
RENAL FUNCTION TESTS:
Blood urea, Creatinine, Urea and Creatinine clearance and urea Concentration tests.
- Unit-3 :** Blood sugar and glucose tolerance tests.
Miscellaneous-Blood uric acid, serum amylase, serum calcium, Phosperous, acid Phosphatase etc.
- Unit-4 :** Knowledge of calibration and volumetric glassware. The underlying principles, care and use of analytical

balances, Photo-electric calorimeters, Visual Calorimeters, Spectrophotometer, Flamephotometer, Phmeters, centrifuges, water baths, Thermometers, etc. Stirring and cleaning of glasswares, knowledge of common types of glass pipettes and Micro pipettes.

Maintenance of Laboratory:

Solutions, reagents and chemicals.

Instruments and glasswares.

Introduction to auto analysers (Chemistry analyzer and electrolyte analyser).

Introduction to Radio immuno Assay.

Methods of preparing distilled water and its used in Biochemistry Laboratory:- metal-distilled water, Glass distilled water, Deionized water.

Unit-5 : C.S.F. Examination-Physical, chemical and microscopic examination.

Gastric analysis.

Stool examination for blood, fats etc. serum electrophoresis.

Syllabus For Practical Examination For Biochemistry:

- 1] Commonly use glass wares, Instruments, chemicals and reagents.
- 2] Determination tests.
 - Metabolites, * Glucose, GTC, * BUN, * Urea, * Creatinine, * Proteins: Albumin, Globullin, A/G ratio, total proteins * Total and direct bilirubin, * Uric acid, * Lipid profile – TG, Cholesterol, LDL, HDL.
 - Minerals : Na, K, Cl, Ca, P etc.
 - Enzymes : ALT, AST, acid and Alkaline phosphatase, amylase etc.
- 3] Urine Analysis – Normal / Abnormal constituents – Urine reports.
- 4] CSF Analysis – Tests for sugar, proteins, chlorides etc.
- 5] Determination of Hb derivatives – Spectroscopy.
- 6] Organ function tests – Liver kidney, stomach etc.
- 7] Use of colorimeter – Beer Lambert's Law.

Books Recommended as Reference Books for Biochemistry :

- 1] Clinical chemistry in diagnosis and treatment: Zilwa J.F., Pannoll Peter R, Mayne Philip D, Edward Arnold Publications.
- 2] Practical Clinical Biochemistry : Varley Publications: Villiam Heinemann.
- 3] A Biologist's guide to principles and techniques of practical biochemistry; William and Wilson – Edward Arnold Publications.
- 4] Lynch's Medical Laboratory Technology: Raphael D.B., W.B.Saunders Publications.
- 5] Practical Biochemistry – Plummer.
- 6] Text Book Medical Biochemistry by Ramakrishnan, Prasannan and Rajan.
- 7] Biochemistry by A.C. Deb.
- 8] Medical Biochemistry by MN Chaterjee and Rana Shinde.
- 9] Medical Biochemistry by Debajyoti Das.
- 10] Hawk's Physiological chemistry – Editor Hawk.
- 11] Practice of Biochemistry in clinical Medicine - R.L..Nath
- 12] Textbook of Medical Laboratory Technology - P.B. Gadkar, & D.P. Gadkar.

SANT GADGE BABAAMRAVATI UNIVERSITY, AMRAVATI
SPECIAL NOTE FOR INFORMATION OF THE STUDENTS

- (1) Notwithstanding anything to the contrary, it is notified for general information and guidance of all concerned that a person, who has passed the qualifying examination and is eligible for admission only to the corresponding next higher examination as an ex-student or an external candidate, shall be examined in accordance with the syllabus of such next higher examination in force at the time of such examination in such subjects papers or combination of papers in which students from University Departments or Colleges are to be examined by the University.
- (2) Be it known to all the students desirous to take examination/s for which this prospectus has been prescribed should, if found necessary for any other information regarding examinations etc., refer the University Ordinances Booklet the various conditions/provisions pertaining to examination as prescribed in the following Ordinances.

Ordinance No. 1	:	Enrolment of Students.
Ordinance No. 2	:	Admission of Students
Ordinance No. 4	:	National cadet corps
Ordinance No. 6	:	Examinations in General (relevent extracts)
Ordinance No. 18/2001	:	An Ordinance to provide grace marks for passing in a Head of passing and Improvement of Division (Higher Class) and getting Distinction in the subject and condonation of defficiency of marks in a subject in all the faculties prescribed by the Statute No. 18, Ordinance, 2001.
Ordinance No. 9	:	Conduct of Examinations (relevent extracts)
Ordinance No. 10	:	Providing for Exemptions and Compartments
Ordinance No. 19	:	Admission of Candidates to Degrees.
Ordinance No. 109	:	Recording of a change of name of a University student in the records of the University.
Ordinance No. 138	:	For improvement of Division/Grade.
Ordinance No.19/2001	:	An Ordinance for Central Assessment Programme, Scheme of Evaluation and Moderation of answerbooks and preparation of results of the examinations, conducted by the University, Ordinance 2001.

Registrar
Sant Gadge Baba Amravati University

INDEX

SYLLABUS FOR
Post Graduate Diploma in Medical Laboratory Technology
PROSPECTUS NO. 071421

Sr. No.	Subject	Page No.
1.	Special Note for Information of the Students	1
2.	Ordinance No. 11 of 2003	2 - 4
3.	Syllabus for Theory Examination for Pathology	5
4.	Syllabus for Practical Examination for Pathology	6
5.	Books Recommended as Reference Books for Pathology	6 - 7
6.	Syllabus for Theory Examination for Microbiology	7
7.	Syllabus for Practical Examination for Microbiology	7 - 8
8.	Books Recommended as Reference Books for Microbiology	8
9.	Syllabus for Theory Examination for Biochemistry	8 - 9
10.	Syllabus for Practical Examination for Biochemistry	9
11.	Books Recommended as Reference Books for Biochemistry	9