



# BLDE UNIVERSITY

## PG CURRICULUM

### 2012-13

### MD Biochemistry

Published by

**BLDE UNIVERSITY**

[Declared as Deemed to be University u/s 3 of UGC act, 1956, vide notification No.F.9-37/2007-U.3(A)]

The Constituent College

**SHRI B. M. PATIL MEDICAL COLLEGE, HOSPITAL & RESEARCH CENTRE**

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## B.L.D.E. UNIVERSITY

(Declared vide notification No. F.9-37/2007-U 3 (A) Dated. 29-2-2008 of the MHRD, Government of India under Section 3 of the UGC Act,1956)  
The Constituent College

SHRI. B. M. PATIL MEDICAL COLLEGE, HOSPITAL AND RESEARCH CENTRE

BLDEU/REG/PG/2012-13/845

September 20, 2012

### NOTIFICATION

Subject: Revised Curriculum for the Post Graduate Degree and Diploma Courses – 2012

Reference:

1. Medical Council of India Regulation on Graduate Medical Education, 1997 and subsequent amendments of the same from time-to-time.
2. Minutes of the meeting of the Academic Council of the University held on April 11, 2012
3. Minutes of the meeting of the BOM of the University held on May 23, 2012.

The Board of Management of University is pleased to approve the Curriculum for Post Graduate Degree and Diploma Courses at its meeting held on May 23, 2012.

The revised curriculum shall be effective, from the Academic Session 2012-13 onwards, for Post Graduate Degree and Diploma Course in the Constituent College of the University viz Shri B. M. Patil Medical College, Hospital and Research Centre.

To,  
The Dean, Faculty of Medicine and Principal  
Shri B. M. Patil Medical College,  
Hospital and Research Centre,  
BIJAPUR

  
REGISTRAR  
REGISTRAR.  
BLDE University, Bijapur.

Copy to:

1. The Secretary, UGC, New Delhi
2. The Controller of Examinations
3. Prof. & HODs of Pre, Para and Clinical Departments.
4. PS to Hon'ble President
5. PS to Hon'ble Vice Chancellor
6. Office Copy

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## **Vision and Mission**

- *Committed to provide globally competitive quality medical education.*
- *To provide the best health care facilities in this backward region, in particular, to socially disadvantaged sections of the society.*
- *Constantly striving to become a reputed research University with world-class infrastructure, latest tech-tools for teaching/research and adopting global best practices.*

## ***Section - I***

### **Goals and General Objectives of Postgraduate Medical Education Program**

#### **Goal**

The goal of postgraduate medical education shall be to produce a competent specialist and / or a medical teacher:

- (i) Who shall recognize the health needs of the community, and carry out professional obligations ethically and in keeping with the objectives of the national health policy;
- (ii) Who shall have mastered most of the competencies, retraining to the specialty, that are required to be practiced at the secondary and the tertiary levels of the health care delivery system;
- (iii) Who shall be aware of the contemporary advances and developments in the discipline concerned;
- (iv) Who shall have acquired a spirit of scientific inquiry and is oriented to the principles of research methodology and epidemiology; and
- (v) Who shall have acquired the basic skills in teaching of the medical and paramedical professionals.

#### **General Objectives**

At the end of the postgraduate training in the discipline concerned the student shall be able to:

- (i) Recognize the importance of the concerned specialty in the context of the health need of the community and the national priorities in the health sector.
- (ii) Practice the specialty concerned ethically and in step with the principles of primary health care.
- (iii) Demonstrate sufficient understanding of the basic sciences relevant to the concerned specialty.
- (iv) Identify social, economic, environmental, biological and emotional determinants of health in a given case, and take them into account while planning therapeutic, rehabilitative, preventive and promotive measures/strategies.

- (v) Diagnose and manage majority of the conditions in the specialty concerned on the basis of clinical assessment, and appropriately selected and conducted investigations.
- (vi) Plan and advice measures for the prevention and rehabilitation of patients suffering from disease and disability related to the specialty.
- (vii) Demonstrate skills in documentation of individual case details as well as morbidity and mortality data relevant to the assigned situation.
- (viii) Demonstrate empathy and humane approach towards patients and their families and exhibit interpersonal behavior in accordance with the societal norms and expectations.
- (ix) Play the assigned role in the implementation of national health programs, effectively and responsibly.
- (x) Organize and supervise the chosen/assigned health care services demonstrating adequate managerial skills in the clinic/hospital or the field situation.
- (xi) Develop skills as a self-directed learner; recognize continuing educational needs; select and use appropriate learning resources.
- (xii) Demonstrate competence in basic concept of research methodology and epidemiology, and be able to critically analyze relevant published research literature.
- (xiii) Develop skills in using educational methods and techniques as applicable to the teaching of medical/nursing students, general physicians and paramedical health workers.
- (xiv) Function as an effective leader of a team engaged in health care, research or training.

### **Statement of the Competencies**

Keeping in view the general objectives of postgraduate training, each discipline shall aim at development of specific competencies, which shall be defined and spelt out in clear terms. Each department shall produce a statement and bring it to the notice of the trainees in the beginning of the program so that he or she can direct the efforts towards the attainment of these competencies.

### **Components of the PG Curriculum**

The major components of the PG curriculum shall be:

- Theoretical knowledge
- Practical/clinical Skills
- Training in writing thesis/research articles
- Attitudes, including communication.
- Training in research methodology, medical ethics & medicolegal aspects

Source: Medical Council of India, Regulations on Postgraduate Medical Education, 2000. [amended upto January 2010]

**Eligibility for Admission:**

Eligibility requirements for Post Graduate Diploma and Degree Courses are : -

1. The candidates seeking admission to these courses should have passed MBBS from the college recognized by Medical Council of India.

Eligibility requirements for Post graduate degree in superspeciality courses,M.Ch./D.M are:

The candidate seeking admission to these courses should have passed MS/MD from the college recognized by Medical Council of India.

2. As per the requisitions of statutory bodies, as laid out in post graduate regulations 2000 of Medical Council of India and its amendments thereof, the minimum percentage of marks in the entrance test conducted by the University for eligibility for admission to Post Graduate courses in broad specialties and super specialties shall be 50 percent for candidates belonging to General category and 40 percent for the candidates belonging to Scheduled Caste, Scheduled Tribes and Other Backward Classes. Eligibility for persons with locomotor disability of lower limbs category will be 45 percent.

Eligibility for Foreign / PIO / NRI students will be based on qualifying examination marks.

**The MCI norms to qualify for Admissions**

Candidates seeking admission to these Post Graduate Degree courses should have passed M.B.B.S. recognised by Medical Council of India or equivalent qualification and should have obtained permanent Registration from the Medical Council of India or any of the State/ Medical council or candidate should register the same within one month from the date of admission, failing which the admission of the candidate shall be cancelled. Provided that in the case of a foreign national, the MCI may on the payment of prescribed fee for the registration, grant temporary registration for the duration of post graduate training restricted to the medical college/ institute to which the applicant is admitted for the time being exclusively for post graduate studies; provided further, that temporary registration to such foreign national shall be subjected to the condition that such person is duly registered with appropriate registering authority in his /her country wherefrom he has obtained his basic medical qualification ,and is duly recognized by the corresponding Medical Council or concerned authority.

If the candidate fails to fulfill the relevant eligibility requirements as mentioned above he/she will not be considered eligible for admission for Medical Postgraduate Degree and Diploma Courses even if he/she is placed in the merit list of BLDEU-PGET/BLDEU-SUPERSPECIALTY ET.

### **Obtaining Eligibility Certificate by the University before making Admission**

Candidate shall not be admitted for any postgraduate degree/diploma course unless he/she has obtained and produced the eligibility certificate used by the University. The candidate has to make an application to the University with the following documents along with the prescribed fee:

1. MBBS pass/degree certificate issued by the University.
2. Marks cards of all the university examinations passed MBBS course.
3. Attempt Certificate issued by the Principal
4. Certificate regarding the recognition of the Medical College by the Medical Council of India.
5. Completion of internship certificate.
6. In case internship was done in a non-teaching hospital, a certificate from the Medical Council of India that the hospital has been recognized for internship.
7. Registration by any State Medical council and
8. Proof of SC/ST or OBC or physically handicapped status, as the case may be.

In addition to the above mentioned documents, candidate applying for admission to superspeciality courses has to produce degree/pass certificate of MD/MS degree with prescribed fee.

### **Intake of Students**

The intake of students to each course shall be in accordance with the ordinance in this behalf.

### **Course Duration**

a. M.D. / M.S. Degree Courses:

The course of study shall be for a period of 3 years consisting of 6 terms including examinations. For Candidates possessing recognized two year Postgraduate Diploma in the same subject the duration of the course shall be two years including examinations. (MCI PG REG 2000 10:1)

b.D.M/M Ch Degree Courses;(MCI PG REG 2000,10:2)

The duration of these courses shall be for a period of 3 years including examinations.

c.Diploma Courses:

The course of study shall be for a period of 2 years consisting of 4 terms including examinations(MCI PG REG 2000,10.3).

### **Training Method**

The postgraduate training for degree/diploma shall be of residency pattern. The post graduate shall be trained with graded responsibilities in the management and treatment of patients entrusted to his/her care. The participation of the students in all facets of educational process is essential. Every candidate should take part in seminars, group discussions grand rounds, case demonstration, clinics, journal review meetings, CPC and clinical meetings. Every candidate should be required to participate in the teaching and training program of undergraduate students. Training should include involvement in laboratory and experimental work, and research studies. Basic medical sciences students should be posted to allied and relevant clinical departments or institutions. Similarly, clinical subjects' students should be posted to basic medical sciences and allied specialty departments or institutions.

### **Attendance, Progress and Conduct**

A candidate pursuing degree/diploma course should work in the concerned department of the institution for the full period as a full time student. No candidate is permitted to run a clinic/laboratory/nursing home while studying postgraduate course

Each year shall be taken as a unit for the purpose of calculating attendance. Every student shall attend symposia, seminars, conferences, journal review meetings, grand rounds, CPC, case presentation, clinics and lectures during each year as prescribed by the department and not absent himself / herself from work without valid reasons. Every Candidate is required to attend a minimum of 80% of the training during each academic year of the post graduate course. This shall include assignments, assessed full time responsibilities and participation in all facets of educational process. Provided further, leave of any kind shall not be counted as part of academic term without prejudice to minimum 80% attendance of training period every year. Leave benefits shall be as per university rules.

A post graduate student pursuing degree course in broad specialities, MD,MS and superspeciality courses DM,M.Ch would be required to present one poster presentation, read one paper in national/state conference and to present one research paper which should be published/accepted for publication/sent for publication during the period of his postgraduate studies so as to make him/her to be eligible to appear at the university degree examinations.(MCI,PG 2000,13.9)

Any student who fails to complete the course in the manner stated above shall not be permitted to appear for the University Examinations.



## **Monitoring Progress of Studies**

The learning process of students should be monitored through continuous appraisal and regular assessment. It not only helps teachers to evaluate students, but also students to evaluate themselves. The monitoring is done by the staff of the department based on participation of students in various teaching / learning activities. It may be structured and assessment done by using checklists that assess various aspects.

The learning out comes to be assessed include:

- Personal Attitudes,
- Acquisition of Knowledge,
- Clinical and operative skills,
- Teaching skills.

### **Personal Attitudes:**

The essential items are:

- Caring attitudes
- Initiative
- Organizational ability
- Potential to cope with stressful situations and undertake responsibility
- Trust worthiness and reliability
- To understand and communicate intelligibly with patients and others
- To behave in a manner which establishes professional relationships with patients and colleagues
- Ability to work in team
- A critical enquiring approach to the acquisition of knowledge

The Methods used mainly consist of observation. It is appreciated that these items require a degree of subjective assessment by the guide, supervisors and peers.

### **Acquisition of Knowledge:**

The methods used comprise of 'Log Book' which records participation in various teaching / learning activities by the students. The number of activities attended and the number in which presentations are made are to be recorded. The log book should periodically be validated by the supervisors. Some of the activities are listed. The list is not complete. Institutions may include additional activities, if so, desired.

Lectures: Lectures are to be kept to a minimum. They may, however, be employed for teaching certain topics. Lectures may be didactic or integrated.

a) Didactic Lectures: Recommended for selected common topics for post graduate students of all specialties. Few topics are suggested here.

- Bio-statistics
- Use of library,
- Journal review
- Use of computers,
- Appropriate use of AV aids
- Research Methods,
- Search of literature,
- Rational drug therapy
- Medical code of Conduct and Medical Ethics
- National Health and Disease Control Programmes
- Communication skills etc.

These topics may preferably taken up in the first few weeks of the 1<sup>st</sup> year commonly for all new postgraduates

b) Integrated teaching : These are recommended to be taken by multidisciplinary teams for selected topics, eg. Jaundice, Diabetes mellitus, thyroid diseases etc.

#### **Journal Review Meeting (Journal club):**

The ability to do literature search, in depth study, presentation skills, and use of audio – visual aids are to be assessed. The assessment is made by faculty members and peers attending the meeting using a checklist

#### **Seminars / symposia:**

The topics should be assigned to the student well in advance to facilitate in depth study. The ability to do literature search, in depth study, presentation skills and use of audio – visual aids are to be assessed using a checklist.

#### **Clinico-Pathological conferences:**

This should be a multidisciplinary case study of an interesting case to train the candidate to solve diagnostic and therapeutic problems by using an analytical approach. The presenter(s) are to be assessed using a check list similar to that used for seminar.

**Medical Audit:** Periodic morbidity and mortality meeting be held. Attendance and participation in these must be insisted upon. This may not be included in assessment.

**Clinical Skills:** Day to Day Work: Skills in outpatient and ward work should be assessed periodically. The assessment should include the candidates' sincerity and punctuality, analytical ability and communication skills

**Clinical Meetings:**

Candidates should periodically present cases to his peers and faculty members. This should be assessed using a check list

**Clinical and Procedural Skills:**

The candidate should be given graded responsibility to enable learning by apprenticeship. The performance is assessed by the guide by direct observation. Particulars are recorded by the student in the log book.

**Teaching Skills:**

Candidates should be encouraged to teach undergraduate medical students and paramedical students, if any. This performance should be based on assessment by the faculty members of the department and from feedback from the undergraduate students

**Work diary / Log Book:**

Every candidate shall maintain a work diary and record his/her participation in the training programs conducted by the department such as journal reviews, seminars, etc. Special mention may be made of the presentations by the candidate as well as details of clinical or laboratory procedures, if any, conducted by the candidate. The work diary shall be scrutinized by concerned teachers periodically and certified, by the Head of Department and Head of the Institution, and presented during university practical / Clinical examination.

**Periodic tests:**

In case of degree courses of three years duration ( MD/MS, DM, M.Ch), the concerned departments may conduct three tests, two of them be annual tests, one at the end of first year and the other in the second year. The third test may be held three months before the final examination. The tests may include written papers, practical / clinical and viva voce.

One of these practical/clinical tests should be conducted by OSPE(objective structured practical examination or OSCE(objective structured clinical examination) method.

.Records and marks obtained in such tests will be maintained by the Head of Department and sent to the University, when called for,

In case of diploma courses of two years duration, the concerned departments may conduct two tests, one of them be at the end of first year and the other in the second year three months before the final examination. The tests may include written papers, practical /clinical and viva voce.

One of these practical/clinical tests should be conducted by OSPE or OSCE method.

**Records:** Records and marks obtained in tests will be maintained by the Head of the Departments and will be made available to the University or MCI.

**Procedure for defaulter:**

Every department should have a committee to review such situations. The defaulting candidate is counseled by the guide and head of the department. In extreme cases of default the departmental committee may recommend that defaulting candidate be withheld from appearing the examination, if she/he fails to fulfill the requirements in spite of being given adequate chances to set himself or herself right.

**Dissertation:** Every candidate pursuing MD/MS degree course is required to carry out work on a selected research project under the guidance of a recognized post graduate teacher. The results of such a work shall be submitted in the form of a dissertation.

The dissertation is aimed to train a post graduate student in research methods and techniques. It includes identification of a problem, formulation of hypothesis, search and review of literature, getting acquainted with recent advances, designing of a research study, collection of data, critical analysis and comparison of results and drawing conclusions.

Every candidate shall submit to the Registrar (Academic) of the University in the prescribed proforma, a synopsis containing particulars of proposed dissertation work within six months from the

date of commencement of the course on or before the dates notified by the University. The synopsis shall be sent through the proper channel.

Such synopsis will be reviewed and the dissertation topic will be registered by the University. No change in the dissertation topic or guide shall be made without prior approval of the University.

The dissertation shall be written under the following headings:

1. Introduction
2. Aims or Objectives of study
3. Review of Literature
4. Material and Methods
5. Results
6. Discussion
7. Conclusion
8. Summary
9. References
10. Tables
11. Annexure

The written text of dissertation shall be not less than 50 pages and shall not exceed 150 pages excluding references, tables, questionnaires and other annexure. It should be neatly typed in double line spacing on one side of paper (A4 size, 8.27" x 11.69") and bound properly. Spiral binding should be avoided. The dissertation shall be certified by the guide, head of the department and head of the Institution.

Four copies of dissertation thus prepared shall be submitted to the Controller of Examinations six months before final examination on or before the dates notified by the University.

The dissertation shall be valued by examiners appointed by the university. Approval of dissertation work is an essential precondition for a candidate to appear in the University examination.

**Guide:**

The academic qualification and teaching experience required for recognition by this University as a guide for dissertation work is as per Medical Council of India Minimum Qualifications for Teachers in Medical Institutions Regulations, 1998. Teachers in a medical college/institution having a total of eight years teaching experience out of which at least five years teaching experience as Lecturer or Assistant Professor gained after obtaining post graduate degree shall be recognized as post graduate teachers.

A Co-guide may be included provided the work requires substantial contribution from a sister department or from another medical institution recognized for teaching/training by this University / Medical Council of India. The co-guide shall be a recognized post graduate teacher of BLDE University

**Change of guide:**

In the event of a registered guide leaving the college for any reason or in the event of death of guide, guide may be changed with prior permission from the university.

**Schedule of Examination:**

The examination for M.D. /M.S and DM/M.Ch courses shall be held at the end of three academic years (six academic terms). The examination for the diploma courses shall be held at the end of two academic years (four academic terms).

The university shall conduct two examinations in a year at an interval of four to six months between the two examinations. Not more than two examinations shall be conducted in an academic year.

## **Scheme of Examination**

**M.D. /M.S. Degree**

M.D. / M.S. Degree examinations in any subject shall consist of dissertation, written papers (Theory), Practical/Clinical and Viva Voce.

**Dissertation:**

Every candidate shall carryout work and submit a Dissertation as indicated above. Acceptance of dissertation shall be a precondition for the candidate to appear for the final examination.

**Written Examination (Theory):**

Written examination shall consist of **four** question papers, each of **three** hours duration. Each paper shall carry 100 marks. Out of the **four** papers, the 1<sup>st</sup> paper in clinical subjects will be on applied aspects of basic medical sciences. Recent advances may be asked in any or all the papers. In basic medical subjects and para-clinical -subjects, questions on applied clinical aspects should also be asked.

**Practical / Clinical Examination:**

In case of practical examination, it should be aimed at assessing competence and skills of techniques and procedures as well as testing students ability to make relevant and valid observations, interpretations and inference of laboratory or experimental work relating to his/her subject.

In case of clinical examination, it should aim at examining clinical skills and competence of candidates for undertaking independent work as a specialist. Each candidate should examine at least one long case and two short cases.

The total marks for Practical / clinical examination shall be 200.

**Viva Voce:**

Examination shall aim at assessing depth of knowledge, logical reasoning, confidence and oral communication skills.

The total marks shall be 100:

- 80 Marks, for examination of all components of syllabus
- 20 Marks for Pedagogy

**Examiners:**

There shall be at least four examiners in each subject. Out of them two shall be external examiners and two shall be internal examiners. The qualification and teaching experience for appointment as an examiner shall be as laid down by the Medical Council of India.

Criteria for declaring as pass in University Examination: A candidate shall secure not less than 50% marks in each head of passing which shall include (1) Theory, (2) Practical/ clinical and(3)viva voce examination. The candidate should pass independently in practical/clinical examination and Viva Voce vide MCI pg 2000 reg no 14(4)(Ciii)

A candidate securing less than 50% of marks as described above shall be declared to have failed in the examination. Failed candidate may appear in any subsequent examination upon payment of fresh fee to the Controller of Examinations.

Declaration of distinction: A successful candidate passing the University examination in first attempt will be declared to have passed the examination with distinction, if the grand total aggregate of marks is 75 percent and above.

Distinction will not be awarded for candidates passing the examination in more than one attempt.

## **D.M/M.Ch Degree**

DM/M.Ch Degree examinations in any subject shall consist of written theory papers(theory),practical/clinical and Viva voce.

### **Written Examination (Theory):**

Written examination shall consist of **four** question papers, each of **three** hours duration. Each paper shall carry 100 marks. Out of the **four** papers, the 1<sup>st</sup> paper in clinical subjects will be on applied aspects of basic medical sciences. Recent advances may be asked in any or all the papers. In basic medical subjects and para-clinical -subjects, questions on applied clinical aspects should also be asked.

### **Practical / Clinical Examination:**

In case of practical examination, it should be aimed at assessing competence and skills of techniques and procedures as well as testing students ability to make relevant and valid observations, interpretations and inference of laboratory or experimental work relating to his/her subject.

In case of clinical examination, it should aim at examining clinical skills, competence of candidates for undertaking independent work as a specialist. Each candidate should examine at least one long case and two short cases.

The total marks for Practical / clinical examination shall be 200.

### **Viva Voce:**

Examination shall aim at assessing depth of knowledge, logical reasoning, confidence and oral communication skills.

The total marks shall be 100:

- 80 Marks, for examination of all components of syllabus
- 20 Marks for Pedagogy

### **Examiners:**

There shall be at least four examiners in each subject. Out of them two shall be external examiners and two shall be internal examiners. The qualification and teaching experience for appointment as an examiner shall be as laid down by the Medical Council of India.



Criteria for declaring as pass in University Examination: A candidate shall secure not less than 50% marks in each head of passing which shall include (1) Theory, (2) Practical including clinical and (3) viva voce examination. The candidate should pass independently in practical/clinical examination vide MCI pg 2000 reg no 144-c(iii).

Declaration of distinction: A successful candidate passing the University examination in first attempt will be declared to have passed the examination with distinction, if the grand total aggregate of marks is 75 percent and above.

A candidate securing less than 50% of marks as described above shall be declared to have failed in the examination. Failed candidate may appear in any subsequent examination upon payment of fresh fee to the Controller of Examinations.

Distinction will not be awarded for candidates passing the examination in more than one attempt.

### **Diploma Examination:**

Diploma examination in any subject shall consist of Theory (written papers),  
Practical / Clinical and Viva-Voce.

### **Theory:**

There shall be **three** written question papers each carrying 100 marks. Each paper will be of **three** hours duration. In clinical subjects one paper out of this shall be on basic medical sciences. In basic medical subjects and Para clinical subjects, questions on applied clinical aspects should also be asked.

### **Practical / Clinical Examination:**

In case of practical examination it should be aimed at assessing competence, skills related to laboratory procedures as well as testing students ability to make relevant and valid observations, interpretation of laboratory or experimental work relevant to his/her subject.

In case of clinical examination, it should aim at examining clinical skills and competence of candidates for undertaking independent work as a specialist. Each candidate should examine at least one long case and two short cases.

The maximum marks for Practical/Clinical shall be 150.

Viva-Voce Examination: Viva Voce examination should aim at assessing depth of knowledge, logical reasoning, confidence and oral communication skills. The total marks shall be 50.

Criteria for declaring as pass in University Examination: A candidate shall secure not less than 50% marks in each head of passing which shall include (1) Theory, (2) Practical / clinical and viva voce examination.

A candidate securing less than 50% of marks as described above shall be declared to have failed in the examination. Failed candidate may appear in any subsequent examination upon payment of fresh fee to the Controller of Examinations.

Declaration of distinction: A successful candidate passing the University examination in first attempt will be declared to have passed the examination with distinction, if the grand total aggregate of marks is 75% and above. Distinction will not be awarded for candidates passing the examination in more than one attempt.

**Examiners:**

There shall be at least four examiners in each subject. Out of them, two shall be external examiners and two shall be internal examiners. The qualification and teaching experience for appointment as an examiner shall be as laid down by the Medical Council of India.

Number of Candidates per day:

The maximum number of candidates for practical / clinical and viva-voce examination shall be as under:

MD / MS Courses: Maximum of 6 per day

Diploma Courses: Maximum of 6 per day

DM/M.Ch Courses: Maximum of 3 per day

## SECTION - II

### **M.D. BIOCHEMISTRY**

#### **Goals:**

The post graduate course in M.D.Biochemistry should enable the student, to acquire an in depth knowledge of the fundamental principles of the subject Biochemistry, so that he/she can apply this knowledge, for understanding the basis of health and disease.

At the end of the course the student should have gained knowledge and expertise so that he/she is equipped to pursue a career in one or more of the following facets of Biochemistry teaching, diagnostic work and research.

#### **Objectives**

A candidate upon successfully qualifying in the M.D Biochemistry examinations should be able to:

- i. Be a competent Biochemist
- ii. Work as a teacher in medical faculty both at undergraduate & postgraduate level
- iii. Supervise modern laboratory techniques & procedures in clinical Biochemistry in the hospital
- iv. Pursue her/his interest to undergo further specialization
- v. Carry out & conduct various research programmes both at basic and applied level
- vi. Guide thesis at both Post Graduate and Doctoral level
- vii. Suggest, evaluate and interpret Biochemical investigations in a given clinical situation and apply knowledge in clinical problems

#### **Specific Learning Objectives**

- i. Understand the concept of Biochemistry regarding Biomolecules, Carbohydrates, Proteins, Lipids, Nucleic acids, Enzymes, Minerals and vitamins.
- ii. Have knowledge of intermediary metabolism of the above & regulation of individual metabolism
- iii. Possess the knowledge of the impairment of metabolism including inborn errors of metabolism
- iv. Understand the role of nutrition in health & disease
- v. Apply biochemical knowledge in normal & diseased states
- vi. Have knowledge regarding the analysis of biological fluids for its chemical constituents & correlating the same in health & disease
- vii. Develop skills of performing biochemical techniques like Electrophoresis, Colorimetry, Spectrophotometry, Flame photometry & interpreting the data. Optional ELISA, RIA, Molecular Biology techniques

## Postgraduate Training

Based on the available facilities, department can prepare a list of postgraduate experiments pertaining to basic and applied biochemistry. Active learning should form the mainstay of postgraduate training, there should be lectures for postgraduates (at least 20 per year). Along with seminars, symposia, group-discussions, Journal clubs. The postgraduate students should regularly attend the ward rounds of various clinical departments and learn cases of interest for discussion with the Biochemistry faculty. They should render special investigative services in their respective area of specialization. Each college should have medical education unit to generate teaching resource material for UG and evolving the problem solving modules.

## Course Content

### Theory

#### **Paper – I BIOPHYSICAL, ORGANIC ASPECTS OF BIOCHEMISTRY AND BIOCHEMICAL TECHNIQUES,**

##### **A. BIOPHYSICAL, ORGANIC ASPECTS OF BIOCHEMISTRY AND BIOCHEMICAL TECHNIQUES**

- i. Electrolytes, pH buffer system, colloids, law of mass action, surface tension, osmosis, diffusion, and molecular weight determination.
- ii. Analytical Biochemistry & Instrumentation: Principles & application of colorimetry, fluorometry, spectrophotometry, Radioactive isotopes and its applications in medicine, atomic absorption spectrophotometry, spectroscopy, osmometry, centrifugation, nephelometry and chemiluminescence, Flame Photometry, ISE, Semiautoanalyzer, autoanalyzer, ELISA, RIA, PCR and turbidimetry
- iii. Bioseparative techniques:  
Chromatography- Column, Paper, TLC, GLC, HPLC, Affinity  
Electrophoresis- Paper, Cellulose Acetate, Agarose, SDS, PAGE
- iv. Protein conformation, interactions, structure activity relationship
- v. Only the description of accepted structures is required. Structure, physical & chemical properties of the following are required.
  - a) Ribose, xylose, mannose, galactose, fructose, deoxy sugars, aminosugars, uronic acids, lactose, maltose, sucrose, starch, insulin, glycogen, cellulose, glycoaminoglycans.
  - b) Saturated & unsaturated fatty acids, their derivatives, triacyl glycerol, phospholipids, glycolipids, sterols, lipoproteins.
  - c) Amino acids, peptides, polypeptides, hemoglobin, immunoglobulin, collagen and proteoglycans, levels of organization of proteins with reference to insulin & Hb. Protein conformation, interaction and structure activity relationship.
  - d) Purine, pyrimidine, their derivatives, nucleic acids, nucleotide & polynucleotides.

## B. RESEARCH METHODOLOGY AND MEDICAL BIO-STATISTICS

### RESEARCH METHODOLOGY

- i. Basic principles and related aspects – Aims and Objectives of research , Modern methods of research, Types of research, Steps in research ,Drug Research ,Clinical trials, Animal house, Research Laboratory
- ii. Ethical issues related to research on human subjects and animals.
- iii. Ethical guidelines for Biomedical Research on human subjects of ICMR(2000), Ethical guidelines of ICMR(2001) on animal use, INSA guidelines for care and use of Animals in research (2001), CPSEA Guidelines (2001), Breeding and experiments on animals (Control and Supervision) rules 1998 under Prevention of cruelty to animals Act 1960.

### MEDICAL BIO-STATISTICS

- i. Basic principles and concepts of biostatistics as applied to health sciences, like concepts of probabilities, mean, standard deviation, law of chance, binomial expression, Bare Heinberg Law st. test/ analysis of variance, coefficient of correlation, evaluation of new diagnostic procedure etc.
- ii. Statistical methods in research, mean, SD, SE, P, distribution, regression and correlations.
- iii. Computer based applications.

## **Paper – II CELL BIOLOGY, MOLECULAR BIOLOGY AND HUMAN GENETICS, INBORN ERRORS OF METABOLISM**

### A. CELL BIOLOGY

- i. Structure of cell, general and specific features, cytoskeleton, nucleus, nucleolus, mitochondria and plasmic reticulum, ribosomes, golgi complex, lysosomes, plasma membranes, gap junctions, cell division – mitosis and meiosis, cell cycle.
- ii. Ultra centrifugation, cell fractionation and differentiation of cellular and subcellular organelles.
- iii. Biomembranes, receptors, membrane bound substance mechanisms of transport across the cell membranes.

### B. MOLECULAR BIOLOGY AND HUMAN GENETICS

- i. DNA & RNA as genetic materials, duplication of RNA and DNA, transcription, messenger, transfer and ribosomes their structure and function regulation and expression of genes, regulation of translation, genetic engineering, molecular biology and viruses, molecular basis of cancer.
- ii. Mechanism of action of cytotoxic drugs and antibiotics.
- iii. Immunogenetics, cytogenetics, genetic counseling, Basics of Bioinformatics

### C. INBORN ERRORS OF METABOLISM

Inborn errors of carbohydrates, lipids amino acids, protein nucleic acids, mineral metabolism

**Paper – III INTERMEDIARY METABOLISM, MICRO AND MACRO NUTRIENTS AND HUMAN NUTRITION**

**A. ENZYMES**

- i. General properties, classification and nomenclature, kinetic model, Km value factors influencing enzyme action, specificity, mechanism of enzyme action, enzyme kinetics, regulation of enzyme action, isolation, isoenzymes, coenzymes, clinical enzymology
- ii. Biological oxidation and reduction, bioenergetics.
- iii. Digestion and absorption of food and other nutrients
- iv. Detoxication / xenobiotics
- v. Chemical anatomy of human body

**B. VITAMINS AND MINERALS**

- i. Structure, source, daily requirements, physiological role and deficiency manifestations of vitamins, hypo and hypervitaminosis and antivitamin
- ii. Mechanisms of action of coenzymes
- iii. Mineral metabolism and role of micro and macronutrients

**C. INTERMEDIARY METABOLISM**

- i. Methods of studying intermediary metabolism
- ii. Intermediary metabolism of carbohydrates, lipids, proteins and amino acids, nucleic acids in human system
- iii. Muscular contraction, nerve conduction, coagulation of blood
- iv. Metabolism in specialized tissues like erythrocytes, lens, nervous tissue, adipose tissue, connective tissue, collagen, bone etc
- v. Metabolic interrelationships and metabolism in starvation

**D. HUMAN NUTRITION**

Principal food components, general nutritional requirements, energy requirements, biological value of proteins, specify dynamic action, balanced diet, diet formulation in health and disease, mixed diet, nutritional supplements, food toxins and additives, parenteral nutrition, disorders of nutrition, obesity, protein energy malnutrition, dietary fibers, under- nutrition, laboratory diagnosis of nutritional disorders, National Nutritional programmes.

**Paper – IV CLINICAL BIOCHEMISTRY, QUALITY CONTROL, IMMUNOLOGY, ENDOCRINOLOGY, BIOMEDICAL WASTE MANAGEMENT, RECENT ADVANCES**

**A. CLINICAL BIOCHEMISTRY ALONG WITH INVESTIGATIVE ASPECTS,**

- i. Diabetes mellitus and secondary degenerative changes associated with diabetes mellitus, glycogenesis, galactosemia, mucopolysaccharidosis, reducing substances in urine and aids to laboratory diagnosis of these disorders.
- ii. Ketosis, atherosclerosis, fatty liver, lipoidoses, hyperlipoproteinemias, hypolipoproteinemias and laboratory diagnosis
- iii. Aminoacidurias, uremia, phenylketonuria, hemoglobinopathies, immunoglobulinopathies, porphyrias laboratory diagnosis
- iv. Malabsorption syndromes and their laboratory diagnosis
- v. Gastric and pancreatic function tests

- vi. Acid base balance, fluid and electrolyte balance and related disorders; renal function tests
- vii. CSF in health and disease
- viii. Hepatobiliary function tests and jaundice
- ix. Clinical enzymology
- x. Endocrinal disorders and laboratory diagnosis
- xi. Diseases of circulatory system, hemopoietic system
- xii. Diseases of heart, kidneys- principles of peritoneal and hemodialysis
- xiii. Diseases of digestive systems and related organs like liver, pancreas etc
- xiv. Diseases of lungs, musculoskeletal system
- xv. Disease of central nervous system
- xvi. Hereditary disorders
- xvii. Radioimmunoassay and enzyme immunoassay and their clinical application
- xviii. Biochemistry of cancer, tumor markers.
- xix. Disorders of Calcium and Phosphorus metabolism.
- xx. Investigative aspects of all diseases mentioned above in the course content

#### B. IMMUNOLOGY

Concepts of immunity. Antigen, Antibodies, Ag-Ab reaction, complement system, Structure & functions of immune system, Immune response of the body, immune deficiency diseases, hypersensitivity, autoimmunity, immunology of transplantation & malignancy, immunological disorders.

#### C. ENDOCRINOLOGY

- i. Classification and general mechanism of action of hormones
- ii. Secretion, control, transport and mode of action of following hormones hypothalamic peptides, adenohipophyseal, neurohypophyseal, thyroid, parathyroid calcitonin, pancreatic, adenocortical, medullary, gonadal, gastrointestinal, opioid peptides, endorphins.
- iii. Biochemistry of conception, reproduction and contraception
- iv. Endocrine interrelationship and their involvement in metabolic regulation
- v. Neuromodulators and their mechanism of action, physiological significance

#### D. LABORATORY MANAGEMENT AND BASIC CONCEPTS OF QUALITY CONTROL

- i. Method Evaluation: Analytical goals, precision and accuracy, bias, sensitivity and specificity, selection of method and evaluation.
- ii. Total Quality Control: Fundamental concepts, control of pre analytical, analytical and post analytical variables, internal and external quality control programmes, Accreditation programmes.
- iii. Automation: Definition, instrumental concepts, types of analyzers, trends in automation in Biochemistry laboratory, Laboratory information system.

#### E. BIOMEDICAL WASTE MANAGEMENT

#### F. ENVIRONMENTAL BIOCHEMISTRY

#### G. RECENT ADVANCES IN BIOCHEMISTRY

Recent biochemical concepts in health and disease, newer analytical methods – as discussed in recent/current Medical/Biochemical Journals and recent editions of textbooks of Biochemistry

## **PRACTICALS**

1. Estimation of proteins by Folin's method and Dye binding method
2. Titration of amino acid – Formal titration & pK values
3. Two-dimensional Paper chromatography for separation of amino acids
4. Ion exchange chromatography
5. Paper electrophoresis
6. Estimation of glycogen, cholesterol, casein and hemoglobin from biological samples
7. Estimation of Blood glucose and Glucose tolerance test
8. Estimation of Cholesterol, Triglycerides, free fatty acids and Phospholipids
9. Estimation of Electrolytes, pH and blood gas analysis
10. Estimation of Urea, Creatinine, Uric acid, Ammonia including clearance tests
11. Estimation of bilirubin and hepato biliary function tests
12. Estimation of Ca, Mg, Cu, Ceruloplasmin, Fe, Fe binding capacity
13. Thyroid function tests and other hormone assays by ELISA/RIA
14. Urinalysis for normal and abnormal constituents
15. Determination of enzyme activity and study of enzyme kinetics
16. Estimation of LDH, Phosphatases, aminotransferases, GGT, amylase and CK isoenzymes
17. Separation of LDH/alkaline phosphates isoenzymes by PAGE
18. Estimation of vitamins A, E, C.
19. Estimation of ethyl alcohol in blood & urine
20. Analysis of CSF and any other fluid
21. Estimation of glycosylated hemoglobin, troponin, myoglobin, microalbumin
22. Estimation of Lp (a). Apo A, Apo B.

### **Clinical/practical Biochemistry training:**

I year, later half of the II year, and first half of the III year (2 years) study and training in the department of Biochemistry. Later half of the III year exclusive clinical Biochemistry posting for a period of 6 months. Every post graduate student in Biochemistry shall be posted to clinical Biochemistry laboratory of the department where clinical investigations of the attached hospital are done. Student should be trained in collection of samples, carrying out investigations, interpretation, reporting of the results and maintainance of records of investigations quality assurance.

### **Practical Record:**

Student should maintain practical record for General Biochemistry and Clinical Biochemistry separately of all practicals done during the course and submit at the time of university Examination after duly certified by the Head of the Department



## **Time schedule & Rotational Postings:**

The candidate shall attend all the U G Theory and Practical classes regularly (For one batch of students preferably during the first year)

During the first half of the second year of the course postings may be made to attend other clinical/para clinical subjects in coordination with the concerned departments only in the forenoon sessions as follows:

### **I) RESEARCH METHODOLOGY AND BIOSTATISTICS: 15 DAYS**

To understand the basics of various research methodology and medical biostatistics and also to attend a basic workshop on research methodology and medical biostatistics (3 days)

### **II) MEDICINE: 3 MONTHS.**

To learn clinical examination of patients and required biochemical investigations and relevance, drawing of blood and body fluids and collection of urine sample and storage and transport to the laboratory.

### **III) NEUROLOGY: 15 DAYS.**

To learn clinical examination of patients and required biochemical investigations and relevance. To observe and understand various techniques like EEG/EMG and its interpretation.

### **IV) NEPHROLOGY: 15 DAYS.**

To learn clinical examination of patients and required biochemical investigations and relevance. To observe and understand dialysis technique and related complications.

### **V) GASTROENTEROLOGY: 15 DAYS.**

To learn clinical examination of patients and required biochemical investigations and relevance. To observe and understand various endoscopic techniques and interpretation.

### **VI) CARDIOLOGY: 15 DAYS.**

To learn clinical examination of patients and required biochemical investigation and relevance. To observe and understand working of ECG apparatus, Echo, Colour Doppler, TMT and cardiac monitor and interpretation.

### **VII) ENDOCRINOLOGY: 15 DAYS.**

To learn clinical examination of patients and required biochemical investigations and relevance. To observe and understand the RIA techniques, Chemiluminescence and interpretation.

Total six months of clinical postings. At the end of these postings the certificate has to be obtained from the concerned Heads of the Department about satisfactory learning or otherwise. During posting in medical and other related department the student should acquire relevant basic clinical knowledge and skills.

## **YEAR WISE P G ACTIVITIES**

### **First year of the course :**

The P.G. student is required to

- a. To attend all UG Teaching sessions (Lectures, Tutorials and Practicals).
- b. To participate in seminars and journal club activities.
- c. To select and submit the topic of dissertation.
- d. To do reference work.
- e. To do self study.
- f. Training in answering model questions.

### **Second year of the course :**

P.G. graduate student is required to

- a. To do work of dissertation.
- b. To do UG Teaching.
- c. To participate in activities like seminars, journal club, symposia, workshops and group discussions.
- d. To start writing the laboratory manuals.
- e. To attend rotation postings in other departments .
- f. To attend state and national level conferences.
- g. To do self study.
- h. Training in answering model questions

### **Third year of the course :**

The P.G. student is required to

- a. To complete and submit dissertation 6months before commencement of University examinations.
- b. To complete the writing of laboratory manuals.
- c. To do UG teaching.
- d. To participate in activities like seminars, journal club, symposia, workshop , panel discussion and group discussion.
- e. To attend conference at State and National level.
- f. To present a paper basing on his/her dissertation work in Institutional Scientific Research Society as well as at least one State / National conference before appearing for the examinations.
- g. To publish at least one Research paper or send it for publication in an indexed journal before University examinations.

- h. To do self study.
- i. Training in answering model questions

### **Seminars & Journal reviews.**

The postgraduate students should actively participate in departmental seminars and journal clubs. A record showing the involvement of the student shall be maintained. A diary should be maintained. Seminars and journal clubs are suggested to be conducted alternately once in every 15 days. Preferably seminar should be conducted by choosing topics from the theoretical aspects and Journal review should be conducted by choosing topics from recent advances, topics related to Dissertation Work from recent journals.

During three years of the course, Postgraduate students shall participate in teaching undergraduate students in practicals, tutorials and group discussions.

### **Dissertation Work**

During the course of study every candidate has to prepare a dissertation individually, on a selected topic under the direct guidance and supervision of a recognized postgraduate teacher as per MCI and university regulations.

The suggested time schedule for dissertation work is:

1. Selection of the topic for dissertation - within 2 months of joining.
2. Preparation of work for dissertation synopsis including pilot study and submission of the synopsis to the University within 6 months from the commencement of course or as per the dates notified by the University from time to time.
3. Data collection for dissertation and writing the dissertation.
4. The candidates shall report the progress of the dissertation work to the concerned guide periodically and obtain clearance for the continuation of the dissertation work.
5. Submission of the dissertation six months prior to the final examination or as per the dates notified by the University from time to time.

### **Registration of dissertation topic:**

Every candidate shall submit a synopsis in the prescribed proforma for registration of dissertation topic by the University after it is scrutinized by the PG training cum Research Committee of the institution. The synopsis shall be sent to within the first 6 months from the commencement of the course or as notified by the University in the calendar of events, to the Registrar (Academic).

### **Submission of dissertation:**

The dissertation shall be submitted to the Controller of Examinations of the University six months prior to the final examination or as notified in the calendar of events.

Approval of the dissertation by the panel of examiners is a prerequisite for a candidate to appear for the University examination.

### **Maintenance of Record of Work Done, Periodical assessment and progress report.**

1. A diary showing each day's work has to be maintained by the candidate, which shall be scrutinized by the Head of the Department once in every three months.
2. A practical record has to be maintained by the every candidate and duly scrutinized and certified by the HOD and to be submitted to the external examiner during the final examination.
3. A list of the seminars and journal reviews that have been attended and participated by the student has to be maintained which should be scrutinized by the Head of the Department.

## **Scheme of Examination**

### **University Examination**

#### **1. Theory: 400 Marks**

The written examination consists of four papers of 100 marks each. Each paper will be of three hours duration. Questions on recent advances may be asked in any or all papers\*.

Paper – I	BIOPHYSICAL, ORGANIC ASPECTS OF BIOCHEMISTRY AND BIOCHEMICAL TECHNIQUES.
Paper – II	CELL BIOLOGY, MOLECULAR BIOLOGY HUMAN GENETICS, AND INBORN ERRORS OF METABOLISM
Paper – III	INTERMEDIARY METABOLISM, MICRO AND MACRO NUTRIENTS AND HUMAN NUTRITION
Paper – IV	CLINICAL BIOCHEMISTRY, QUALITY CONTROL, IMMUNOLOGY ENDOCRINOLOGY, BIOMEDICAL WASTE MANAGEMENT, RECENT ADVANCES

**\*The topics assigned to the different papers are given as general guidelines. A strict division of subjects may not be possible. Some overlapping of topics is inevitable. Students should be prepared to answer the overlapping topics.**

**Each theory paper will consist of:** Long Essay type questions - 2 x 20 marks = 40

Short Essay type questions - 6 x 10 marks = 60

**2. Practicals 200 Marks**

**Duration Two Days**

The assignments of work under Part I and Part II should begin on day 1 and the candidate is expected to complete the work by forenoon on second day, so that viva-voce and pedagogy examinations are held on the second day afternoon.

**Part I : 100 Marks**

**Major Experiment: 75 Marks**

A blood sample from a patient to be given with clinical history and probable diagnosis. Student has to estimate relevant parameters and interpret the result. Suitable standard with standard graph should be done.

**Minor Experiment: 25 Marks**

Qualitative analysis of any biological / body fluid (Urine, CSF, Pleural Fluid etc.) and interpretation.

**Part II : 100 Marks**

**Major Experiment : 75 Marks**

Experiment involving chromatography or electrophoresis to be given. Separation and identification of amino acids or carbohydrates by chromatography or separation and interpretation of serum Proteins, Lipoproteins ,Isoenzymes (LDH or CPK) by electrophoresis to be given.

**Minor Experiment : 25 Marks**

Screening test for inborn errors in metabolism – such as Porphyrrias, Phenylketonuria, Galactosemia, Alkaptonuria etc.

**3. Viva Voce 100 marks**

**j. The Viva-Voce Examination 80 marks**

Viva-voce examination would be on all components of syllabus including discussion on dissertation.

**ii. Pedagogy Exercise 20 marks**

A topic would be given to each candidate along with the Practical Examination question paper on the first day. Student is asked to make a presentation on the topic on the second day for 8-10 minutes.

Maximum marks for	Theory	Practicals	Viva-Voce	Total
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<b>M.D. BIOCHEMISTRY Examination</b>	400	200	100	700
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## **LIST OF BOOKS-RECOMMENDED FOR MD CURRICULUM**

**(All the books are to be recent editions)**

1. Tietz-Text book of Clinical Chemistry and Molecular Diagnostics. Burtis, Ashwood, Burns.
2. Harper's Illustrated Biochemistry. Robert K.Murray.
3. Lehninger's Principles of Biochemistry. David L. Nelson and Michael M.Cox.
4. Practical Biochemistry-Principles and Techniques. Keith Wilson and John Walker.
5. Biochemistry. Lubert Strayer and Jeremy.M.Berg.
6. Metabolic and molecular Basis of Inherited Diseases. Scriver et al.
7. Devlin's Text book of Biochemistry with Clinical Correlations. Parslow GP, Wood EJ.
8. Biochemistry. Donald Voet and Judith Voet.
9. William's Textbook of Endocrinology. P.Reed Larsen, Henry M.Kronenberg Shlomo Melmed, and Kenneth S.Polonsky.
10. Harrison's principles of Internal Medicine Dennis L.Kasper, Eugene Braunwald, Stephen Hauser, Dan Longo, J.Larry Jameson, Anthony S.
11. Molecular cell Biology-Lodish.H, Berk A, Baltimore D.
12. Kuby Immunology. Thomas J. Kindt, Barbara A. Osborne, Richard A. Goldsby
13. Principles and Techniques of Biochemistry and Molecular Biology. Keith Wilson, John Walker.
14. Clinical Diagnosis and Management by Laboratory Methods. Todd, Stanford, Davidson, John Bernhard.
15. Modern Nutrition in Health and Disease. Maurice E.Shills, Moshe Shike.
16. Practical Physiological Chemistry. Hawk and Philip.B.
17. Enzymes, Biochemistry, Biotechnology, Clinical Chemistry.Trevor Palmer.
18. Methods in Enzymology.M.Dickson and EC Webb.
19. Modern Experimental Biochemistry.Rodney Boyer.
20. Human Nutrition and dietetics. Leybourne Stanley, Patrick Davidson, R.Passmore.
21. Practical Biochemistry. Harold Varley.
22. Cell and Molecular biology. De Robertis.
23. Methods in Biostatistics.B.K.Mahajan.
24. Practical Immunology.Talvar.
25. Text book of Biochemistry. West and Todd.
26. Comparative Biochemistry and Physiology. Reaven.
27. Essentials of Clinical Immunology. Chappel.

## **JOURNALS RECOMMENDED FOR M.D BIOCHEMISTRY COURSE**

1. Clinica Chimica Acta
2. British Journal of Nutrition
3. American Journal of Nutrition
4. Journal of Lipid Research
5. Clinical Chemistry
6. Clinical Biochemistry
7. Journal of Laboratory Investigation
8. Biochemical Journal
9. Metabolism
10. Nature
11. Nature Medicine
12. Science
13. Lancet
14. Journal of Endocrinology
15. Trends in Biochemical Sciences
16. Federation of American Societies for Experimental Biology (FASEB)
17. Annual review of Biochemistry
18. Immunology
19. Indian Journal Clinical Chemistry
20. Indian Journal of Biophysics and Biochemistry

## SECTION III

### MEDICAL ETHICS

#### Sensitization and Practice

##### Introduction

There is now a shift from the traditional individual patient, doctor relationship, and medical care. With the advances in science and technology and the needs of patient, their families and the community, there is an increased concern with the health of society. There is a shift to greater accountability to the society. Doctors and health professionals are confronted with many ethical problems. It is, therefore necessary to be prepared to deal with these problems. To accomplish the Goal (i), General Objectives (ii) stated in Chapter II (pages 2.1 to 2.3), and develop human values it is urged that **ethical sensitization** be achieved by lectures or discussion on ethical issues, clinical case discussion of cases with an important ethical component and by including ethical aspects in discussion in all case presentations, bedside rounds and academic postgraduate programs.

##### Course Contents

1. Introduction to Medical Ethics
  - What is Ethics?
  - What are values and norms?
  - Relationship between being ethical and human fulfillment
  - How to form a value system in one's personal and professional life
  - Heteronomous Ethics and Autonomous Ethics
  - Freedom and personal Responsibility
2. Definition of Medical Ethics
  - Difference between medical ethics and bio-ethics
  - Major Principles of Medical Ethics 0
    - Beneficence = fraternity
    - Justice = equality
    - Self determination (autonomy) = liberty
3. Perspective of Medical Ethics
  - The Hippocratic Oath
  - The Declaration of Helsinki
  - The WHO Declaration of Geneva
  - International code of Medical Ethics (1993)
  - Medical Council of India Code of Ethics
4. Ethics of the Individual
  - The patient as a person
  - The Right to be respected



Truth and confidentiality

The autonomy of decision

The concept of disease, health and healing

The Right to health

Ethics of Behavior modification

The Physician – Patient relationship

Organ donation

5. The Ethics of Human life

What is human life?

Criteria for distinguishing the human and the non-human

Reasons for respecting human life

The beginning of human life

Conception, contraception

Abortion

Prenatal sex-determination

In vitro fertilization (IVF), Artificial Insemination by Husband (AIH)

Artificial Insemination by Donor (AID)

Surrogate motherhood, Semen Intra fallopian Transfer (SIFT),

Gamete Intra fallopian Transfer (GIFT), Zygote Intra fallopian Transfer (ZIFT),

Genetic Engineering

6. The family and society in Medical Ethics

The Ethics of human sexuality

Family Planning perspectives

Prolongation of life

Advanced life directives – The Living Will

Euthanasia

Cancer and Terminal Care

7. Profession Ethics

Code of conduct

Contract and confidentiality

Charging of fees, Fee-splitting

Prescription of drugs

Over-investigating the patient

Low – Cost drugs, vitamins and tonics

Allocation of resources in health cares

Malpractice and Negligence

8. Research Ethics

Animal and experimental research / humanness

Human experimentation

Human volunteer research – Informed Consent

Drug trials\

ICMR Guidelines for Ethical Conduct of Research – Human and Animal

ICH / GCP Guidelines  
Schedule Y of the Drugs and Cosmetics Act.

9. Ethical work -up of cases
  - Gathering all scientific factors
  - Gathering all human factors
  - Gathering value factors
  - Identifying areas of value – conflict, setting of priorities,
  - Working our criteria towards decisions

### Additional reading

1. Compendium of Recommendations of Various committees on Health and Development (1943-1975)  
DGHS, 1985 Central Bureau of Health Intelligence, Directorate General of Health Services, Min. Of Health and Family Welfare, Govt. of India, Nariman Bhawan New-Delhi, P-335
2. National Health Policy: Min. of Health & Family Welfare, Nirman Bhawan, New Delhi, 1983
3. Santosh Kumar: The elements of Research, writing and editing 1994, Dept. of Urology, JIPMER, Pondicherry.
4. Srinivasa D K et al : Medical Education Principles and Practice, 1995. National Teacher Training Centre, JIPMER, Pondicherry.
5. Ethical guidelines for biomedical research on human participants  
I.C.M.R. New Delhi 2006.
6. Code of Medical Ethics framed under Section 33 of the Indian Medical Council Act, 1956. Medical Council of India, Kotla Road, New Delhi.
7. Francis C.M: Medical Ethics, Jaypee Publications, Bangalore, 2<sup>nd</sup> Edn-2004.
8. Indian National Science Academy, Guidelines for care and use of animals in Scientific Research, New Delhi, 1994.
9. Internal National Committee of Medical Journal Editors, Uniform requirements for manuscripts submitted to biomedical journals, N England Journal of Medicine. 1991, 424-8
10. Kirkwood B.R. Essentials of Medical Statistics, 1<sup>st</sup> Ed. Oxford, Blackwell Scientific Publications 1988.
11. Mahajan B.K.: Methods in Bio-statistics for Medical students, 5<sup>th</sup> Edition new Delhi, Jaypee Brothers Medical Publishers, 1989.
12. K.R. Sundaram, S.N. Dwivedi, V. Srinivas. Medical Statistics. Principles & Methods  
.B.I. Publications, New Delhi, 2010
13. R.K. Chaube: Consumer Protection Act and Medical Profession, 1st Edition, 1999, Jaypee Brothers.

### Integrated Teaching Programme

Sl. N	Name of the Topic	Name of the Subtopic & Dept.	Name of the Subtopic & Dept.	Name of the Subtopic & Dept.	Name of the Subtopic & Dept.	Name of the Subtopic & Dept.
01	Anemia	Erythropoiesis & Hemoglobin (Phy)	Pathophysiology of Anemia (Patho)	Investigations in Anemia (Bio)	Medical Management of Anemia (Med)	Public Health Importance (Comm.Med)
02	Acid base balance	Role of lungs & kidneys (Phy)	Investigations in Acid base disorders (Bio)	Medical Management of Acid base disorders (Med)	----	----
03	Myasthenia gravis	Biochemistry of NMJ (Phy)	Pathophysiology of Myasthenia gravis (Patho)	Investigations in Myasthenia gravis (Bio)	Immunity in Myasthenia gravis (Micro)	Medical Management of Myasthenia gravis (Med)
04	Diabetes Mellitus	Insulin (Phy)	Pathophysiology of Diabetes of Mellitus (Patho)	Investigations in Diabetes Mellitus (Bio)	Medical Management of Diabetes Mellitus (Med)	Surgical Management of Diabetic foot (Surg)
05	Parkinsonism & Alzheimer Disease	Physiology of basal ganglia & memory (Phy)	Pathophysiology of Parkinsonism & Alzheimer Disease (Patho)	Investigations in Parkinsonism & Alzheimer Disease (Bio)	Medical Management of Parkinsonism & Alzheimer Disease (Med)	-----

## SECTION IV

### ANNEXURES

#### Check List – I

#### MODEL CHECK-LIST FOR EVALUATION OF JOURNAL

#### REVIEW PRESENTATIONS

Name of the Student:

Name of the Faculty/Observer:

Date:

Sl. No	Items for observation during presentation	Poor 1	Average 2	Good 3	Excellent 4
1.	Article Chosen was				
2.	Extent of understanding of scope & objectives of the paper by the candidate				
3.	Whether cross references have been consulted				
4.	Whether other relevant publications consulted				
5.	Ability to respond to questions on the paper / subject				
6.	Audio-Visual aids used				
7.	Ability to defend the paper				
8.	Clarity of presentation				
9.	Any other observation				
	<b>Total Score</b>				

## Check List – II

### MODEL CHECK-LIST FOR EVALUATION OF SEMINAR PRESENTATIONS

Name of the Student:

Name of the Faculty/Observer:

Date:

Sl. No	Items for observation during presentation	Below Average 1	Average 2	Good 3	Very Good 4
1.	Whether other relevant publications consulted				
2.	Whether cross references have been consulted				
3.	Completeness of Preparation				
4.	Clarity of Presentation				
5.	Understanding of subject				
6.	Ability to answer questions				
7.	Time scheduling				
8.	Appropriate use of Audio-visual aids				
9.	Any other observation				
	<b>Total Score</b>				

### Check List – III

#### MODEL CHECK LIST FOR EVALUATION OF DAY TO DAY LEARNING, TEACHING AND RESEARCH ACTIVITIES

(To be completed once a month by Guide and to be counter signed by HOD)

Name of the Student:

Name of the Guide :

Month

:

Sl. No.	Points to be considered	Below Average 1	Average 2	Good 3	Very Good 4
1.	Regularity of attendance				
2.	Punctuality				
3.	Interaction with Teachers, colleagues and supportive staff				
4.	Maintenance of Notes.				
5.	Ability to conduct Theory & Tutorial Classes				
6.	Ability to demonstrate Laboratory Procedure.				
7.	Completeness Preparation for Classes				
8.	Rapport with students.				
9.	Commitment to Research and Departmental Activities.				
10.	Overall quality of day to day work.				
	<b>Total Score</b>				

Signature of Guide

Signature of HOD

**Check List – IV**

**EVALUATION FORM FOR PRACTICAL PROCEDURE**

Name of the Student:

Name of the Faculty:

Date:

<b>Sl. No</b>	<b>Points to be considered</b>	<b>Below Average 1</b>	<b>Average 2</b>	<b>Good 3</b>	<b>Very Good 4</b>
1.	Psychomotor skills				
2.	Logical order				
3.	Mentioned all positive and negative points of importance				
4.	Accuracy in performing the procedure.				
5.	Ability to interpret result				
6.	Clinical Correlation.				
7.	Ability to elicit the signs.				
	<b>Total Score</b>				

## Check List – V

### MODEL CHECK LIST FOR EVALUATION OF TEACHING SKILL PRACTICE

<b>Sl. No</b>		<b>Strong Point</b>	<b>Weak Point</b>
1.	Communication of the purpose of the talk		
2.	Evokes audience interest in the subject		
3.	The introduction		
4.	The sequences of ideas		
5.	The use of practical examples and/or illustrations		
6.	Speaking style (enjoyable, monotonous, etc., specify)		
7.	Attempts audience participation		
8.	Summary of the main points at the end		
9.	Asks questions		
10.	Answers questions asked by the audience		
11.	Rapport of speaker with his audience		
12.	Effectiveness of the talk		
13.	Uses AV aids appropriately		



### Check List – VI

### MODEL CHECK LIST FOR PRACTICALS /STANDARDIZATION METHODS

Name of the Student:

Sl. No.	Date	Name of the Practical	Remarks	Sign of the teacher In-Charge

**Remarks :** Poor, Below Average 1, Average 2, Good 3, Very Good 4

## Check List – VII

### MODEL CHECK LIST FOR DISSERTATION SYNOPSIS PRESENTATION

Name of the Student:

Name of the Faculty:

Date:

Sl. No.	Points to be considered	Poor	Below Average 1	Average 2	Good 3	Very Good 4
1.	Interest shown in selecting a topic					
2.	Appropriate review of literature					
3.	Discussion with guide & Other faculty					
4.	Quality of Protocol					
5.	Preparation of proforma					
	<b>Total Score</b>					

### Check List – VIII

#### CONTINUOUS EVALUATION OF DISSERTATION WORK BY GUIDE / CO-GUIDE

Name of the Student:

Name of the Faculty:

Date:

Sl. No.	Items for observation during presentation	Below Average 1	Average 2	Good 3	Very Good 4
1.	Periodic consultation with guide/co-guide				
2.	Regular collection of case material				
3.	Depth of analysis / discussion				
4.	Departmental presentation of findings				
5.	Quality of final output				
6.	Others				
	<b>Total Score</b>				

## LOG BOOK

**Table 1: Academic activities attended**

Name:

Admission year:

College:

<b>Date</b>	<b>Type of Activity</b> Specify Seminar, Journal Club, Presentation, UG teaching	<b>Particulars</b>

## LOG BOOK

**Table 2: Academic presentations made by the student**

Name:

Admission Year:

College:

<b>Date</b>	<b>Topic</b>	<b>Type of Presentation</b> <b>Specify Seminar, Journal Club,</b> <b>Presentation, UG teaching Etc.</b>

## LOG BOOK

**Table 3: Diagnostic and Operative procedures performed**

**Name:**

**Academic Year:**

**College:**

<b>Date</b>	<b>Name</b>	<b>ID No.</b>	<b>Procedure</b>	<b>Category O, A, PA, PI*</b>

\* **Key:** O – Washed up and observed

A – Assisted a more senior Surgeon

PA – Performed procedure under the direct supervision of a senior surgeon

PI – Performed independently

### Model Overall Assessment Sheet

Name of the College:

Academic Year:

Sl. No.	Faculty Member & Others	Name of Student and Mean Score									
		A	B	C	D	E	F	G	H	I	J
1.											
2.											
3.											
4.											
5.											
<b>Total Score</b>											

Note: Use separate sheet for each year.

  
**REGISTRAR**  
**BLDE (Deemed to be University)**  
**Vijayapura-586103, Karnataka**