



BLDE

(DEEMED TO BE UNIVERSITY)

Choice Based Credit System (CBCS)

Curriculum

B.Sc. Programme in

Biochemistry

2020-21

Published by

BLDE

(DEEMED TO BE UNIVERSITY)

Declared as Deemed to be University u/s 3 of UGC Act, 1956

The Constituent College

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

Smt. Bangaramma Sajjan Campus, B. M. Patil Road (Sholapur Road), Vijayapura - 586103, Karnataka, India.

BLDE (DU): Phone: +918352-262770, Fax: +918352-263303, Website: www.bldedu.ac.in, E-mail: office@bldedu.ac.in

College: Phone: +918352-262770, Fax: +918352-263019, E-mail: bmpmc.principal@bldedu.ac.in



BLDE

(DEEMED TO BE UNIVERSITY)

Declared as Deemed to be University u/s 3 of UGC Act, 1956

The Constituent College

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

BLDE(DU)/REG/B.Sc.Life-Sci/2020-21/ 187/7

May 12, 2020

NOTIFICATION

Sub: Curriculum for B.Sc. Programme in Life Sciences with Semester Scheme

Ref: 1. Minutes of the meeting of the 5th Standing Committee Academic Council of the University held on 06- 05-2020.

2. Approval of Board of Management dtd.08-05-2020

3. Approval of Hon'ble Vice-Chancellor vide order no.1834, dtd.09-05-2020

In accordance with the Rule-09 (ii) of the Memorandum of Association (MoA) of the Deemed to be University, the Board of Management (BoM) has approved the Curriculum of 'B.Sc. Programme in Life Sciences' in 1) Biotechnology, 2) Microbiology, 3) **Biochemistry**, 4) Food, Nutrition and Dietetics, following Choice Based Credit System (CBCS) with Semester Scheme.

The Curriculum shall be effective from the Academic Session 2020-21 onwards, in the Constituent College of the University viz. Shri B. M. Patil Medical College, Hospital and Research Centre, Vijayapura.



**REGISTRAR
REGISTRAR**

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

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

Copy to:

- The Secretary, UGC, New Delhi
- The Dean, Faculty of Medicine & Principal
- The Controller of Examinations
- The Dean, Student Affairs
- The Prof. & HoDs of Pre, Para and Clinical Departments
- The Coordinator, IQAC
- PS to the Hon'ble Chancellor
- PS to the Hon'ble Vice-Chancellor

Vision:

- To be a leader in providing quality medical education, healthcare & to become an Institution of eminence involved in multidisciplinary and translational research, the outcome of which can impact the health & the quality of life of people of this region.

Mission:

- To be committed to promoting sustainable development of higher education, including health science education consistent with statutory and regulatory requirements.
- To reflect the needs of changing technology
- Make use of academic autonomy to identify dynamic educational programs
- To adopt the global concepts of education in the health care sector

SEMESTER-I

Course	Course Code	Course Name	Ins. Hrs./ Week	Credit	Exam Hrs.	Max. Mark		
						IA	Unl. Exam.	Total
Language	BBC1.1		6	3	3	25	75	100
English	BBC1.2		6	3	3	25	75	100
Core	BBC1.3	Cell Biology	6	4	3	25	75	100
Core Practical	BBC1.4		3	-	-	-	-	-
Allied	BBC1.5	(to choose 1 out of 3) Chemistry I Bio-physics I Bio-instrumentation I	4	4	3	25	75	100
Allied Practical	BBC1.6P		3	-	-	-	-	-
	BBC1.7	Environmental Studies	2	2	3	25	75	100

SEMESTER-II

Course	Course Code	Course Name	Ins. Hrs./ Week	Credit	Exam Hrs.	Max. Mark		
						IA	Unl. Exam.	Total
Language	BBC2.1		6	3	3	25	75	100
English	BBC2.2		6	3	3	25	75	100
Core	BBC2.3	Bio-molecules	6	4	3	25	75	100
Core Practical	BBC2.4P		3	4	6	40	60	100
Allied	BBC2.5	(to choose 1 out of 3) Chemistry II Bio-physics II Bio-instrumentation II	4	4	3	25	75	100
Allied Practical	BBC2.6P		3	2		20	30	50
	BBC2.7	Value Education	2	2			50	50

SEMESTER-III

Course	Course Code	Course Name	Ins. Hrs./ Week	Credit	Exam Hrs.	Max. Mark		
						IA	Un. Exam.	Total
Language	BBC3.1		6	3	3	25	75	100
English	BBC3.2		6	3	3	25	75	100
Core	BBC3.3	Biophysical and Biochemical Techniques I	3	3	3	25	75	100
Core Practical	BBC3.4P		3	-	-	-	-	-
Allied	BBC3.5	(to choose 1 out of 3) Zoology I Microbiology I Statistics for Life Sciences I	4	4	3	25	75	100
Allied Practical	BBC3.6P		3	-	-	-	-	-
Skill based Course I	BBC3.7	Fundamentals of Computers	3	3	3	25	75	100
Non-Major Elective I	BBC3.8	Diagnostic Biochemistry I	2		3	25	75	100

SEMESTER-IV

Course	Course Code	Course Name	Ins. Hrs./ Week	Credit	Exam Hrs.	Max. Mark		
						IA	Un. Exam.	Total
Language	BBC4.1		6	3	3	25	75	100
English	BBC4.2		6	3	3	25	75	100
Core	BBC4.3	Biophysical and Biochemical Techniques II	3	3	3	25	75	100
Core Practical	BBC4.4P		3	6	6	40	60	100
Allied	BBC4.5	(to choose 1 out of 3) Zoology II Microbiology II Statistics for Life Sciences II	4	4	3	25	75	100
Allied Practical	BBC4.6		3	2	3	20	30	50
Skill based Course II	BBC4.8	Computer Applications	3	3	3	25	75	100
Non-Major Elective II	BBC4.9	Diagnostic Biochemistry II	2	2	3	25	75	100

SEMESTER-V

Course Name	Course Code	Course Name	Ins. Hrs./ Week	Credit	Exam Hrs.	Max. Mark		
						IA	Exam.	Total
Core	BBC5.1	Enzymes & Intermediary Metabolism	5	5	3	25	75	100
Core	BBC5.2	Genetics and Molecular Biology	4	5	3	25	75	100
Core	BBC5.3	Human Physiology & Nutritional Biochemistry	4	5	3	25	75	100
Core Practical	BBC5.4P		5	-	-	-	-	-
Elective Practical	BBC5.5P		3	-	-	-	-	-
Elective I	BBC5.6	Medical Lab Technology I	6	4	3	25	75	100
Skill based Course III	BBC5.7	Biostatistics I	3	3	3	25	75	100

SEMESTER-VI

Course Name	Course Code	Course Name	Ins. Hrs./ Week	Credit	Exam Hrs.	Max. Mark		
						IA	Uni. Exam.	Total
Core	BBC6.1	Clinical Biochemistry	6	6	3	25	75	100
Core	BBC6.2	Biotechnology	6	6	3	25	75	100
Core Practical	BBC6.3P		6	9	6	40	60	100
Elective Practical	BBC6.4P	Medical Lab Technology	3	5	6	40	60	100
Elective II	BBC6.5	Medical Lab Technology II	2	2	3	25	75	100
Elective II	BBC6.6	Immunology	4	4	3	25	75	100
Skill based Course IV	BBC6.7	Biostatistics II	3	3	3	25	75	100
Extension Activities	BBC6.8			1		-	-	50
		Total	180	140				3700

Rules and Regulations of Curriculum

B.Sc. Biochemistry

Definitions of Key Words:

1. **Academic Year:** Two consecutive (one odd + one even) semesters constitute one academic year. Choice Based Credit System (CBCS).
2. The CBCS provides choice for students to select from the prescribed courses (core, elective or minor or soft skill courses).
3. **Course:** Usually referred to, as “papers” is a component of a programme. All courses need not carry the same weight. The courses should define learning objectives and learning outcomes. A course may be designed to comprise lectures/ tutorials/ laboratory work/ outreach activities/ project work/ viva/ seminars/ term papers/assignments/ presentations/ self-study etc. or a combination of some of these.
4. **Credit Based Semester System (CBSS):** Under the CBSS, the requirement for awarding a degree or diploma or certificate is prescribed in terms of number of credits to be completed by the students.
5. **Credit:** A unit by which the course work is interpreted. It functions the number of hours of instructions required per week. One credit is equivalent to one hour of teaching (lecture or tutorial) or two hours of practical work/field work per week.
6. **Cumulative Grade Point Average (CGPA):** It is a measure of overall cumulative performance of a student over all semesters. The CGPA is the sum total of the credit points obtained by the student in various courses in all semesters and the sum of the total credits of all courses in all the semesters.
7. **Grade Point:** It is a numerical marking allotted to each letter grade on a 10-point scale.
8. **Letter Grade:** It is an appreciated point of the student’s performance in a selected course. Grades are denoted by letters O, A+, A, B, C and RA x. Programme: An educational programme leading to award of a Degree certificate.
9. **Semester Grade Point Average (SGPA):** It is index of performance of all performance of work in a semester. Its total credit points obtained by a student in various courses registered in a semester and the total course credits taken during that semester. It shall be expressed up to two decimal places.

10. **Semester:** Each semester will consist of minimum of 180 working days. The odd semester may be scheduled from June/ July to December and even semester from December/ January to June.

Duration of Study Programme: The duration of the study Programme for B.Sc. Biochemistry will be of three years including 6 Months of internship.

Program pattern:

- First Semester: July
- Second Semester: January
- Third Semester: July
- Fourth Semester: January
- Fifth Semester-July
- Sixth Semester-January

Eligibility Criteria:

- He/she has passed the Higher Secondary (10+2) with Science (PCB) or equivalent examination recognized by any Indian University or a duly constituted Board with pass marks in Physics, Chemistry, and Biology.
- Minimum percentage of marks: 45% aggregate.

Medium of Instruction:

English shall be the Medium of Instruction for all the Courses of study and for examinations.

CBCS – Definition and benefits: Choice Based Credit System is a flexible system of learning.

The distinguishing features of CBCS are the following:

- It permits students to learn at their own pace.
- The electives are selected from a wide range of elective courses offered by the other University Departments.
- Undergo additional courses and acquire more than the required number of credits.
- Adopt an inter-disciplinary and intra-disciplinary approach in learning.
- Make best use of the available expertise of the faculty across the departments or disciplines
- Has an inbuilt evaluation system to assess the analytical and creativity skills of students in addition to the conventional domain knowledge assessment pattern.

Semester System and Choice Based Credit System:

The semester system initiates the teaching-learning process and screws longitudinal and latitudinal mobility of students in learning. The credit based semester system provides flexibility in designing curriculum and assigning credits based on the course content and hours of teaching. The choice based credit system provides a sun shone" type approach in which the students can take choice of courses, learn and adopt an interdisciplinary approach of learning.

Semesters:

An academic year consists of two semesters:

	UG
Odd Semester 1 st semester	July – December
Odd Semester 3 rd , 5 th semesters	June – October/ November
Even Semester 2 nd , 4 th , 6 th semesters	December – April

Credits:

Credit defines the coefficient of contents/syllabus prescribed for a course and determines the number of hours of instruction required per week. Thus, normally in each of the courses, credits will be assigned on the basis of the number of lectures/ tutorial laboratory work and other forms of learning required, to complete the course contents in a 15-20 week schedule:

- a. **1 credit** = 1 hour of lecture per week
- b. **3 credits** = 3 hours of instruction per week
- ✓ Credits will be assigned on the basis of the lectures (L) / tutorials (T) / Clinical Training (CR) / laboratory work (P) / Research Project (RP) and other forms of learning in a 15- 20 week schedule L - One credit for one hour lecture per week
- c. **P/T** - One credit for every two hours of laboratory or practical
- d. **CR** - One credit for every three hours of Clinical training/Clinical rotation/posting
- e. **RP** - One credit for every two hours of Research Project per week – Max Credit 20- 25

	Lecture - L	Tutorial - T	Practical - P	Clinical Training/ Rotation– CT/CR	Research Project–RP*
1 Credit	1 Hour	2 Hours	2 Hours	3 Hours	2 Hours
RP*	Maximum Credit 20 – 25 / Semester				

Types of Courses: Courses in a programme may be of three kinds:

- **Core Course**
- **Elective Course**
- **Ability Enhancement Compulsory Courses**

Core Course: A course, which should compulsorily be studied by a candidate as a basic requirement is termed as a Core course. There may be a Core Course in every semester. This is the course which is to be compulsorily studied by a student as a basic requirement to complete programme of respective study.

Elective Course: A course which can be chosen from a very specific or advanced the Course of study or which provides an extended scope or which enables an exposure to some other domain or expertise the candidates ability is called an Elective Course.

Discipline Specific Elective (DSE) Course: Elective courses offered by the main Course of study are referred to as Discipline Specific Elective. The University / Institute may also offer discipline related Elective courses of interdisciplinary nature. An elective may be “Discipline Specific Electives (DSE)” gazing on those courses which add intellectual efficiency to the students.

Dissertation / Project: An Elective/Core course designed to acquire special / advanced knowledge, such as supplement study / support study to a project work, and a candidate studies such a course on his own with an advisory support by a teacher / faculty member is called dissertation / project.

Generic Elective (GE) Course: An elective course chosen generally from an unrelated discipline/Course, with an intention to seek exposure is called a Generic Elective. P.S.: A core course offered in a discipline / Course may be treated as an elective by other discipline / Course and vice versa and such electives may also be referred to as Generic Elective.

Ability Enhancement Compulsory Courses: The Ability Enhancement (AE) Courses may be of two kinds: Ability Enhancement Compulsory Courses (AECC) and Skill Enhancement Courses (SEC).

“AECC” courses are the courses based upon the content that leads to Knowledge enhancement (i) Environmental Science and (ii) English/MIL Communication. These are mandatory for all disciplines.

Assigning Credit Hours per Course: While there is flexibility for the departments in allocation of credits to various courses offered, the general formula would be:

- All core course should be restricted to a maximum of 4 credits.
- All electives should be restricted to a maximum of 3 credits.
- All ability enhancement course should be restricted to a maximum of 2 credits.
- Projects should be restricted to a maximum of 20-25 credits.

Rules and Regulation for Examination of Biochemistry Program under CBCS Pattern

- 1. Title of the Programme offered: Biochemistry**
- 2. Duration of the Programme:** Three years for UG course including 6 Months Internship.
- 3. Medium of instruction:** The medium of instruction and examination shall be in English
- 4. Letter Grades and Grade Points:**

Adopted the UGC recommended system of awarding grades and CGPA under Choice Based Credit Semester System.

4.1 Would be following the absolute grading system, where the marks are compounded to grades based on pre-determined class intervals.

4.2 The UGC recommended 10-point grading system with the following letter grades will be followed:

Table 1: Grades and Grade Points:

Letter Grade	Grade Point
O (Outstanding)	10
A+ (Excellent)	9
A (Very Good)	8
B (Good)	7
C (Above Average)	6
F (Fail)/ RA (Reappear)	0
Ab (Absent)	0
Not Completed (NC)	0
RC (<50% in attendance or in Internal Assessment)	

4.3 A student obtaining Grade F/RA will be considered failed and will require reappearing in the examination.

4.4 Candidates with NC grading are those detained in a course (s); while RC indicate student not fulfilling the minimum criteria for academic progress or less than 50% attendance or less than 50% in internal assessments (IA). Registrations of such students for the respective courses shall be treated as cancelled. If the course is a core course, the candidate has to re-register and repeat the course when it is offered next time.

5. CBCS Grading System - Marks Equivalence Table

5.1 Table 2: Grades and Grade Points

Letter Grade	Grade Point	% of Marks
O (Outstanding)	10	86-100
A+ (Excellent)	9	70-85
A (Very Good)	8	60 -69
B (Good)	7	55 -59
C (Above Average) – Passing criteria for Biochemistry	6	50- 54
F (Fail))/ RA (Reappear)	0	Less than 50
Ab (Absent)	0	-
NC- not completed	0	-
RC- Repeat the Course	0	0

5.2 Table 3: Cumulative Grades and Grade Points

Letter Grade	Grade Point	CGPA
O (Outstanding)	10	9.01 - 10.00
A+ (Excellent)	9	8.01 – 9.00
A (Very Good)	8	7.01 – 8.00
B (Good)	7	6.00 - 7.00
C (Above Average)	6	5.01 - 6.00

6. Assessment of a Course: Evaluation for a course shall be done on a continuous basis. Uniform procedure will be adopted under the CBCS to conduct internal assessments (IA), followed by one end-semester university examination (ES) for each course.

6.1 For all category of courses offered (Theory, Practical, Discipline Specific Elective [DE] ; Generic Elective [GE] and Ability Enhancement Courses [AE]; Skills Enhancement Courses [SE] Theory or P (Practical) & RP(Research Project), assessment will comprise of Internal Assessment (IA) in the form of continuous comprehensive evaluation and mid-semester exam, end–semester (ES) examination or college exam as applicable.

6.2 Courses in programs wherein Theory and Practical/Clinical are assessed jointly. The minimum passing head has to be 50% Grade each for theory and practical's separately. RA grade in any one of the components will amount to reappearing in both components. i.e. theory and practical.

7. Eligibility to appear for the end-semester examinations for a course includes:

- 7.1 Candidates having $\geq 75\%$ attendance and obtaining the minimum 40% in internal assessment in each course to qualify for appearing in the end-semester university examinations.
- 7.2 The students desirous of appearing for university examination shall submit the application form duly filled along with the prescribed examination fee.
- 7.3 Incomplete application forms or application forms submitted without prescribed fee or application form submitted after due date will be rejected and student shall not be allowed to appear for examination.

8. Passing Heads

- 8.1 Courses where theory and practical are involved, the minimum passing head shall be 50% in total including the internal assessment.
- 8.2 Elective Courses – the minimum prescribed marks for a pass in elective Course should be 50%. The marks obtained in elective Courses should be communicated to the university before the commencement of the university examination.

9 Detention: A student not meeting any of the above criteria maybe detained (NC) in that particular course for the semester. In the subsequent semester, such a candidate requires improvement in all, including attendance and/or IA minimum to become eligible for the next end-semester examination.

10 The maximum duration for completing the program will be 6 years (minimum duration of program x 2) i.e. (3x2) = 6 years, failing which his/her registration will be cancelled. Full fees of entire program of 3 years may be liable to be paid by the students.

11 Carry over benefit:

- 11.1 A student will be allowed to keep term for Semester II irrespective of number of heads of failure in Semester I.
- 11.2 A student will be allowed to keep term for Semester III if she/he passes each Semester I and II OR fails in not more than 2 courses each in semester I and II.
- 11.3 Student will be allowed to keep term for Semester IV irrespective of number of heads of failure in Semester III. However, student must mandatorily have passed each course of Semester I and II in order to appear for Semester IV exam.
- 11.4 Student will be allowed to keep term for Semester V, if she/he passes Semester I,II, III and IV OR has passed in all courses of Semester I and II and fails in not more than two courses each of Semester III and IV.
- 11.5 Student will be allowed to keep term for Semester VI, irrespective of number of heads of failure in Semester V. However, student must mandatorily have passed each course of Semester I, II, III and IV in order to appear for Semester VI exam.

12 Grace Marks for UG Courses:

- 12.1 A student shall be eligible for grace marks, provided he/she appeared in all the papers prescribed for the examination.
- 12.2 Maximum up to 5 grace marks may be allowed for passing, spread over between Courses.
- 12.3 No grace marks will be awarded in internal evaluation.

13 University End-Semester Examinations

- 13.1 There will be one final university examination at the end of every semester.
- 13.2 A student must have minimum 75% attendance (Irrespective of the type of absence) in theory and practical in each Course to be eligible for appearing the University examination.
- 13.3 The Principal / Director shall send to the university a certificate of completion of required attendance and other requirements of the applicant as prescribed by the university, two weeks before the date of commencement of the written examination.
- 13.4 A student shall be eligible to sit for the examination only, if she / he secure a minimum of 40% in internal assessment (individually in theory and practical as applicable). Internal examinations will be conducted at college/ department level.
- 13.5 Notwithstanding any circumstances, a deficiency of attendance at lectures or practical maximum to the extent of 10% - may be condoned by the Principal / Director.
- 13.6 If a student fails either in theory or in practical, he/ she have to re-appear for both.
- 13.7 There shall be no provision of re-evaluation of answer sheets. Student may apply to the university following due procedure for recounting of theory marks in the presence of the Course experts.
- 13.8 Internal assessment shall be submitted by the Head of the Department to the University through Dean at least two weeks before commencement of University theory examination.

14. Supplementary examination: The supplementary examination will be held in the next semester. Eligibility to appear for supplementary examination will be as per rule number 11.1-11.5.

15. Re-Verification

There shall be provision of re-totaling of the answer sheets; candidate shall be permitted to apply for recounting/re-totaling of theory papers within 8 days from the date of declaration of results.

16. Scheme of University Exam Theory UG Program: General structure / patterns for setting up question papers for Theory / Practical courses, for UG program are given in the following tables. Changes may be incorporated as per requirements of specific courses.

Guidelines to Prepare Internship Research Proposal & Project

1. Selection of Research Problem:

Select your interest area of research, based on felt need, issues, social concern.

- a. State the problem in brief, concise, clear.
- b. State the purpose of selected study & topic.
- c. State the objectives of proposal/project.
- d. Prepare conceptual framework based on operational definition.
- e. Write scope of research proposal/project.

2. Organizing Review of Literature

- a. Study related and relevant literature which helps to decide conceptual framework and research design to be selected for the study
- b. Add specific books, bulletins, periodicals, reports, published dissertations, encyclopaedia and text books
- c. Organize literature as per operational definition
- d. Prepare summary table for review of literature

3. Research Methodology: To determine logical structure & methodology for research project.

- a. Decide and state approach of study i.e. experimental or non-experimental
- b. Define/find out variables to observe effects on decided items & procedure
- c. Prepare simple tool or questionnaire or observational checklist to collect data.
- d. Determined sample and sampling method
- e. Mode of selection ii) Criteria iii) Size of sample iv) Plan when, where and how data will be collected.
- f. Test validity of constructed tool
- g. Check reliability by implementing tool before pilot study(10% of sample size)
- h. Conduct pilot study by using constructed tool for 10% selected sample size

4. Data collection: To implement prepared tool

- a. Decide location
- b. Time
- c. Write additional information in separate exercise book to support inferences and interpretation

5. Data analysis and processing presentation

- a. Use appropriate method of statistical analysis i.e. frequency and percentage
- b. Use clear frequency tables, appropriate tables, graphs and figures.
- c. Interpretation of data:
- d. In relation to objectives
- e. Hypothesis
- f. Variable of study or project
- g. writing concise report

6. Writing Research Report**a. Aims:**

- i. To organize materials to write project report
- ii. To make comprehensive full factual information
- iii. To make appropriate language and style of writing
- iv. To make authoritative documentation by checking footnotes, references & bibliography
- v. To use computers & appropriate software

b. Points to remember

- i. Develop thinking to write research report
- ii. Divide narration of nursing research report
- iii. Use present tense and active voice
- iv. Minimize use of technical language
- v. Use simple, straightforward, clear & concise language
- vi. Use visual aids in form of table, graphs & figures
- vii. Treat data confidentially
- viii. Review & rewrite if necessary

Evaluation Criteria for Project Report

Sr. No	Criteria	Rating					Remark
		1	2	3	4	5	
I	Statement of the problem						
	1. Significance of the problem selected						
	2. Framing of title and objectives						
II	Literature Review						
	1. Inclusion of related studies on the topic and its relevance						
	2. Operational definition						
III	Research Design						
	1. Use of appropriate research design						
	2. Usefulness of the research design to draw the inferences among study variables/						
IV	Sampling Design						
	1. Identification & description of the target population						
	2. Specification of the inclusion & exclusion criteria						

	3. Adequate sample size, justifying the study design to draw conclusions						
V	Data Collection Procedure						
	1. Preparation of appropriate tool						
	2. Pilot study including validity & reliability of tool						
	3. Use of appropriate procedure/ method for data collection						
VI	Analysis of Data & Interpretation						
	1. Clear & logical organization of the finding						
	2. Clear presentation of tables(title, table & column heading)						
	3. Selection of appropriate statistical tests						
VII	Ethical Aspects						
	1. Use of appropriate consent process						
	2. Use of appropriate steps to maintain ethical aspects & principles						
VIII	Interpretation of the finding						
	& appropriate discussion of the results						
IX	Conclusion						
	Summary & recommendations						
X	Presentation/ Report Writing						
	Organization of the project work including language & style of						

Signature of the Evaluator

18. Eligibility for award of degree

18.1 A candidate shall have passed in all the Courses of all semester's I-VI eligible for award of Biochemistry degree.

The performance of a candidate in a course will be indicated as a letter grade, whereas grade point will indicate the position of the candidate in that batch of candidates. A student is considered to have completed a course successfully and earned the prescribed credits if he/she secures a letter grade other than F/RA. A letter grade RA in any course implies he/she has to Re-appear for the examination to complete the course.

18.2 The RA grade once awarded in the grade card of the student is not deleted even when he/she completes the course successfully later. The grade acquired later by the student will be indicated in the grade sheet of the subsequent semester in which the candidate has appeared for clearance in supplementary exams

18.3 If a student secures RA grade in the Project Work/Dissertation, he/she shall improve it and resubmit it, if it involves only rewriting / incorporating the revisions suggested by the evaluators. If the assessment indicates lack of student performance or data collection then the student maybe permitted to re-register by paying the prescribed re-registration fee and complete the same in the subsequent semesters.

A candidate shall be declared to have passed the examination if he/she obtains the following minimum qualifying grade / marks:-

- (a) For Core courses CT (Core Theory), CL (Core Lab), DE (Discipline centric Electives), student shall obtain Grade B (50 % of marks) in the University End Semester Examination (ES) and in aggregate in each course which includes both Internal Assessment and End Semester Examination.
- (b) For Generic Electives (GE), Ability Enhancement (AE) and Skill Enhancement (SE) courses student shall obtain Grade D (40 % of marks) in the College Examination.

19. Guidelines for Clinical Internship or Research internship:

19.1 Internship may be commenced only on completion of all course work. The internship may be observed only at the clinical postings and areas of extension activities of Department of Physiotherapy, BLDEDU. No external postings will be considered during internship. Students are expected to act in a responsible and professional manner at all times during their postings.

19.2 Eligibility for appearing for Internship: On completion of all course work, a candidate is permitted by the Director/Principal to join internship during the beginning of the semester i.e., Odd/ Even.

- 19.3 Responsibilities during internship: During the internship period candidates should show at least 90% attendance. They must engage in practice/ skill based learning of professional conduct. Their learning outcomes must be maintained and presented in the form of logbooks/ case studies/ research project report. The appropriate formats for the postings/ clinical rotations/ research assignments will be as prescribed as required.
- 19.4 Evaluation of internees and award of credits: All internees will be assessed based on their satisfactory attendance, performance in the postings/ research labs and the presentation of the logbook. The credits and hours of internship will be as defined in the FND program

Computation of SGPA and CGPA

The UGC recommends the following procedure to compute the Semester Grade Point Average (SGPA) and Cumulative Grade Point Average (CGPA):

- i. The SGPA is the ratio of sum of the product of the number of credits with the grade points scored by a student in all the courses taken by a student and the sum of the number of credits of all the courses undergone & earned by a student, i.e.,

$$\text{SGPA (Si)} = \frac{\sum(C_i \times G_i)}{\sum C_i}$$

where C_i is the number of credits of the i th course and G_i is the grade point scored by the student in the i th course.

- ii. The CGPA is also calculated in the same manner taking into account all the courses undergone & earned by a student over all the semesters of a programme, i.e.

$$\text{CGPA} = \frac{\sum(C_i \times S_i)}{\sum C_i}$$

Where S_i is the SGPA of the i th semester and C_i is the total number of credits in that semester.

- iii. The SGPA and CGPA shall be rounded off to 2 decimal points and reported in the transcripts.

Illustration of Computation of SGPA and CGPA

Course	Credit	Grade Letter	Grade Point	Credit Point (Credit x Grade)
Course 1	3	A	8	3 X 8 = 24
Course 2	4	B+	7	4 X 7 = 28
Course 3	3	B	6	3 X 6 = 18
Course 4	3	O	10	3 X 10 = 30
Course 5	3	C	5	3 X 5 = 15
Course 6	4	B	6	4 X 6 = 24
	20			139
Illustration for SGPA				

Semester 1	Semester 2	Semester 3	Semester 4
Credit : 20	Credit : 22	Credit : 25	Credit : 26
Semester 5	Semester 6		
Credit : 26	Credit : 25		
Illustration for CGPA			

Thus,

$$\text{CGPA} = \frac{20 \times 6.9 + 22 \times 6.8 + 25 \times 6.6 + 26 \times 6.0 + 26 \times 6.3 + 25 \times 8.0}{144} = 6.75/\text{B}+$$

144

- ii. Transcript: Based on the above recommendations on Letter grades, grade points and SGPA and CGPA, the transcript for each semester and a consolidated transcript indicating the performance in all semesters may be issued.

Course Registration

17.1. After admission to a Program, a student identity number is generated .This PRN number may be used in the process of registration for a course.

17.2 The registration process is a registration for the courses in a semester. The registration card is generated after a student completes the choice of electives. Every student shall register for the stipulated number of Courses/Credits semester wise even if electives are not prescribed in their regulations for the said semester. Every student must register for Elective/Ability Enhancement Courses semester-wise for the courses he/she intends to undergo in that semester within two weeks of commencement of the semester.

The list of students registered for each elective will be communicated to the HoDs/ Course Chairpersons. Students will be requested to authenticate the chosen electives by appending their signature in acceptance with approval by the HoDs/ Course Chairpersons. A soft copy of the registered students will be submitted to the elective course offering departments for their official use.

Re - Entry after Break of Study:

The University regulations for readmission are applicable for a candidate seeking re-entry to a program.

- Students admitted the program and absenting for more than 3 months must seek readmission into the appropriate semester as per university norms.
- The student shall follow the syllabus in vogue (currently approved / is being followed) for the program.
- All re-admissions of students are Course to the approval of the Vice-Chancellor.

Ranking

The first two ranks of the programme will be decided on the basis of grades of CGPA in the courses (core and DE courses only). In case of a tie, marks % [of core and DE courses only] will be taken into account.

Classification of Successful Candidates

Overall Performance in a Program and Ranking of a candidate is in accordance with the University regulations.

Consolidated Grade Card – Biochemistry Program			
Letter Grade	% Marks Range	Grade point	CGPA RANGE
O	80 & Above	10	9.01 – 10
A+	75-80	9	8.01 - 9.00
A	60-74	8	7.01 - 8.00
B+	55-59	7	6.01- 7.00
B	50-54	6	5.01- 6.00
F/RA (Reappear)	Less than 50	0	4.51 – 5.00
Ab (Absent)		0	
Not Completed (NC)		0	
Repeat the course (RC = <50% in attendance or Internal Assessment)		0	

A successful candidate will be:

- i. Who secures not less than O grade with a CGPA of 9.01 – 10.00 shall be declared to have secured 'OUTSTANDING' provided he/she passes the whole examination in the FIRST ATTEMPT;
- ii. Who secures not less than A+ grade with a CGPA of 8.01 – 9.00 shall be declared to have secured 'EXCELLENT' provided he/she passes the whole examination in the FIRST ATTEMPT;
- iii. Who secures not less than A grade with a CGPA of 7.01 –8.00 and completes the course within the stipulated course period shall be declared to have passed the examinations with 'Very Good'
- iv. All other candidates (with grade B and above) shall be declared to have passed the examinations.

SEMESTER -I

BBC1.3 CELL BIOLOGY

UNIT-I

An overall view of cells-origin and evolution of cells. Cell theory. Classifications of cell-Prokaryotic and Eukaryotic cells. Composition of prokaryotic and eukaryotic cells. Molecular composition of Cells- Water, Carbohydrates, Lipids, Nucleic acids, and Proteins.

UNIT-II

Cell membrane- Fluid Mosaic Model of membrane structure. Membrane proteins and their properties. Membrane carbohydrates and their role. Transport across membranes-diffusion, active and passive transport.

UNIT-III

Endoplasmic reticulum - types, structure and functions. Golgi apparatus- structures and functions. Lysosomes- structure and functions, morphology & functions of peroxisomes and glyoxysomes, ribosomes - types, structure and functions.

UNIT-IV

Mitochondria: Structure and function. Cytoskeleton: Types of filaments and their functions. Microtubules: Chemistry and function (esp. cilia and flagella)

UNIT-V

Nucleolus-structure and functions. Chromosome-chromatin structure, the cell cycles- phases of cell cycle. Meiotic and mitotic cell divisions, cell- cell communications, cell recognition, cell adhesion and cell functions.

References

1. Cell biology structure and functions-David and Sadava, Jones Bartlett publishers.
2. Molecular Cell Biology - Lodish, Berk, Zipursky, Baltimore, Freeman.
3. Cytology-P.S. Verma, V.K. Agarwal, S. Chand Publications.
4. Cell Biology-N.Arumugam, Saras Publications.
5. Lehninger Principles of Biochemistry-David L. Nelson, Michael M. Cox, Macmillan worth Publishers.
6. Biochemistry - Garrett Grisham. 3rd edition. International student's edition.
7. Biochemistry by L . Veerakumari , MJP publishers, Chennai-5.

ALLIED I

(To choose any 1 out of the given 3)

BBC1.5 CHEMISTRY I

UNIT - I

- 1.1 Extraction of Metals Minerals and Ore difference - Minerals of Iron, Aluminum and Copper - Ore Dressing or concentration of Ore - Types of Ore Dressing Froth Floatation and Magnetic separation.
- 1.2 Refining of Metals - Types of Refining - Electrolytic, Van Arkel and Zone Refining.
- 1.3 Extraction of Uranium and Thorium.

UNIT - II

- 2.1 Cyclo-alkanes preparation properties of Cyclo-hexane -- Bayers strain theory.
- 2.2 Polarization - Inductive effect, mesomeric effect and steric effect - (Acid and Base strength.)
- 2.3 Stereo isomerism - Types, Causes of optical activity of (lactic acid) and tartaric acid - Racemisation
 - Resolution - Geometrical isomerism
 - Maleic and fumaric acid.

UNIT - III

- 3.1 Chemical Kinetics - Distinction between Order and Molecularity - derivation of First order rate equation - half-life period of first order reaction - determination of rate constant of hydrolysis of ester
 - Catalysis - catalyst - auto catalyst - enzyme catalyst - promoters - catalytic poisoning - Active center - Distinction between homogeneous and heterogeneous catalysts - Industrial application of catalysts.
- 3.3 Photochemistry - Grothus Drapers law, stark einsteines law - quantum yield - photosynthesis, phosphorescence - fluorescence - chemiluminescence's - photosensitization.

UNIT - IV

- 4.1 VSEPR Theory - Shapes of Simple Molecules BF₃, PCl₅, SF₆ and XeF₆
- 4.2 Fuels - Calorific value of fuels - Non-conventional fuels - need of Solar energy - Applications - Bio-fuels.
- 4.3 Osmosis - Osmotic pressure - reverse osmosis - desalination of sea water.

UNIT - V

- 5.1 Nuclear Chemistry - Definition of Half-life period - Group displacement law - Radioactive series. Nuclear Fission and Fusion - Application of nuclear chemistry in Medicine, agriculture, industries - C14 dating.
- 5.2 Crude Oil - Petroleum - Petroleum Refining - Cracking - Applications of Cracking. Naphthalene - Preparations, Properties and uses of Naphthalene - Structure of Naphthalene.
- 5.3 Elements of symmetry - unit cell - crystal lattice - types of cubic lattice - one example for each.

BBC1.5 BIO-PHYSICS I

UNIT-I

Introduction: Illustration of Biophysics: Application of Physics and Chemistry in Biological Sciences. Scientific theory behind the formation of Biomolecules and origin of life. DNA- carrier of genetic message by an experimental proof. DNA, the master plan for cell formation and all cell activities. Central Dogma (DNA → RNA → Protein). An outline of Darwin's theory of evolution.

UNIT-II

Biophysics, the basis: Biophysics is the basis of Biomolecules and molecular system: Membrane Biophysics. Nerve cell, bioelectrical and biochemical conduction of nerve impulses, Membrane potential, resting potential and action potential. Gross bioelectrical phenomenon of ECG and EEG. Molecular basis of muscle contraction, ultra structure and / or molecular basis of vision and hearing.

UNIT-III

Acid and bases-Lewis concept of acid and bases, titrable acidity. pH, pOH, buffer, pH of body fluids, buffers in the body fluids, RBCs and tissues. Measurement of pH by indicator and glass electrode.

UNIT-IV

Zwitterion, pH dependent ionization of amino acid and protein. Structure of protein (primary, secondary, tertiary and quaternary). Different types of bonds that stabilize the protein. Denaturation and renaturation of protein. Behaviour of protein in solution. Structure and biological function of fibrous protein (keratine, collagen), globular protein (Hemoglobin, Methemoglobin).and lipoproteins.

UNIT-V

DNA-double helical structure, Watson-Crick model and base pairing. Fundamental units of nucleic acid- purine, pyrimidine, nucleosides and nucleotides. Size of DNA, Structure of different type of nucleic acid. Special features of double helical DNA. A,B and Z types of DNA. Nucleic acid- Denaturation and annealing of DNA. Synthesis of polynucleotide by Konberg's enzyme. A brief outline of structure and role of different types of RNA.

Reference

1. Biophysics-Principles and Techniques-M.A. Subramanian, MJP Publishers, Chennai-5.
2. Biophysics- M.V. Volbenshtein, MIR publishers, Moscow,1983.
3. Aspects of Biophysics-William Hughes, John Willey and Sons, N.Y., 1979.
4. Biophysical Science-L.E.Ackermann, L.B.E. Ellis and Williams, 1979.
5. Biophysics-Concepts and Mechanisms-E.J. Casey, Von Nostrand Reinhold co., N.Y., 1962.Affiliated to East-West press, New Delhi.

BBC1.5 BIO INSTRUMENTATION I

UNIT-I

Introduction: Introduction of various instrument utilized in Biochemistry, Biomedical and Bioscience laboratories. Basic electronic principles that operate instrument like diode, transistors and their uses in amplifier, operational amplifier and its applications

UNIT-II

Electrophoretic techniques: General principles, factors affecting migration rate-sample, electrical field,

Buffer, voltage and supporting medium. Electrophoresis with paper, cellulose acetate, starch, agar and poly acrylamide, SDS-PAGE, Immunolectrophoresis, Tiselius moving boundary electrophoresis.

UNIT-III

Electrochemical Techniques: Principle of Electrophoretic techniques-Reference electrode, measurement of pH by hydrogen and glass electrode, ion - selective electrode and gas sensor. Oxidation-Reduction (Redox) potentials - Principles, potentiometric titration of oxidation-reduction reactions; Redox dyes and their uses.

Oxygen electrode-principles, operation of a Clark electrode, applications of Oxygen electrode.

UNIT-IV

Approach to Biochemical investigation: Whole animal studies, isotonic salt solution, Osmotic pressure and Osmotic balance, perfusion of isolated organs, tissue slice techniques, methods of using plant and microbial materials, tissue and cell culture- methods of homogenization of tissues and cell fractionation.

UNIT-V

Centrifugal techniques: Basic principle of centrifugation. Differential, density gradient, isopycnic and equilibrium centrifugation techniques. Preparative and analytical ultra centrifugation techniques with special reference to determination of molecular weight of macromolecules (derivation included).

Books Recommended

Practical Clinical Biochemistry - Harold Varley, CBS, New Delhi.

Medical Laboratory Technology-Kanai L. Mukherjee, Tata McGraw Hill., Vol. I,II,III.

Clinical Chemistry- Ranjana Chawla.

Laboratory manual in Biochemistry - Jayaraman. Biochemical methods - S.Sadasivan and Manickam. Introduction to Practical Biochemistry - David T. Plummer

BBC1.7 ENVIRONMENTAL STUDIES

(For all UG Degree Courses)

UNIT-I: INTRODUCTION TO ENVIRONMENTAL SCIENCES: NATURAL

RESOURCES:

Environmental Sciences - Relevance - Significance - Public awareness - Forest resources - Water resources - Mineral resources - Food resources - conflicts over resource sharing - Exploitation - Land use pattern - Environmental impact - fertilizer - Pesticide Problems - case studies.

UNIT-II: ECOSYSTEM, BIODIVERSITY AND ITS CONSERVATION:

Ecosystem - concept - structure and function - producers, consumers and decomposers - Food chain - Food web - Ecological pyramids - Energy flow - Forest, Grassland, desert and aquatic ecosystem.

Biodiversity - Definition - genetic, species and ecosystem diversity - Values and uses of biodiversity - biodiversity at global, national (India) and local levels - Hotspots, threats to biodiversity - conservation of biodiversity - Insitu & Exsitu.

UNIT-III: ENVIRONMENTAL POLLUTION AND MANAGEMENT

Environmental Pollution - Causes - Effects and control measures of Air, Water, Marine, soil, solid waste, Thermal, Nuclear pollution and Disaster Management - Floods, Earth quake, Cyclone and Land slides. Role of individuals in prevention of pollution - pollution case studies.

UNIT-IV: SOCIAL ISSUES - HUMAN POPULATION

Urban issues - Energy - water conservation - Environmental Ethics - Global warming - Resettlement and Rehabilitation issues - Environmental legislations - Environmental protection Act. 1986 - Air, Water, Wildlife and forest conservation Act - Population growth and Explosion - Human rights and Value Education Environmental Health - HIV/AIDS - Role of IT in Environment and Human Health - Women and child welfare - Public awareness - Case studies.

UNIT-V: FIELD WORK

Visit to a local area / local polluted site / local simple ecosystem - Report submission

REFERENCES

1. Kumarasamy, k., a.alagappa moses and m.vasanthy, 2004. Environmental studies, bharathidsan university pub, 1, trichy
2. Rajamannar, 2004, environmental studies, evr college pub, trichy
3. Kalavathy,s. (ed.) 2004, environmental studies, bishop heber college pub., trichy

SEMESTER -II

BBC2.3 BIO-MOLECULES

UNIT-I: Carbohydrates

Classification of carbohydrates, stereo isomerism and optical isomerism of sugars, anomeric form and mutarotation. Occurrence, structure and biological importance of mono, di and polysaccharide (esp. starch, glycogen and cellulose). An introduction to mucopolysaccharide (proteo glycon). Reaction of Carbohydrates due to the presence of hydroxyl, aldehyde and ketone groups.

UNIT-II: Amino acids

Classification and structure of amino acids based on structure. Essential amino acids. Stereo and optical isomerism. Classification and structure of standard amino acid as zwitter ion in aqueous solution.

UNIT-III: Proteins

Introduction, classification based on solubility, shape, composition and function. Structure of proteins-Primary, secondary, tertiary and quaternary. Chemical synthesis of poly peptide chain and solid phase polypeptide synthesis. Biologically important peptides-structure and functions (esp. insulin, glutathione, vasopressin).

UNIT-IV: Lipids

Introduction, definition of fatty acids. Classification, nomenclatures, structures, properties of fatty acids (Essential Fatty Acids) Structure and function of prostaglandins, tri-acyl glycerol. Structure and functions of phospholipids (esp. lecithin cephalin, phosphotidyl inositol and phosphotidyl serine) spingo myelin, plasmologens. Structure and function of glycolipids, cholesterol.

UNIT-V: Nucleic acid

Nature of genetic material, structure of purine and pyrimidine, nucleotide. Composition of DNA and RNA-Watson crick model of DNA. Types of nucleic acid (DNA and RNA). Properties of nucleic acid include T_m , denaturation and renaturation, hypo and hyper chromicity.

References

1. Lehninger Principles of Biochemistry-David L. Nelson, Michael M. Cox, Macmillan Worth Publishers.
2. Harper's Biochemistry-Rober K. Murray, Daryl K. Grammer, McGraw Hill, Lange Medical Books. 25th edition.
3. Fundamentals of Biochemistry-J.L. Jain, Sunjay Jain, Nitin Jain, S. Chand & Company.
4. Biochemistry-Dr. Amit Krishna De, S. Chand & Co., Ltd.

5. Biochemistry-Dr. Ambika Shanmugam, Published by Author.
6. Biomolecules-C.Kannan , MJP Publishers,Chennai-5.

BBC2.4P CORE PRACTICAL I

Objectives

1. Students should know the principles, theory and calculations of each experiment.
2. They should know to prepare all the solutions by themselves. They should standardize their solutions individually.

1. EXPERIMENT INVOLVING TITRIMETRIC PROCEDURES

- a. Estimation of amino acids by formal titration.
- b. Estimation of ascorbic acid by titrimetric method using 2, 6-dichlorophenol indophenol.
- c. Determination of saponification value of edible oil.
- d. Determination of Acid number of edible oil.
- e. Estimation of reducing sugar from biological fluids by Benedict's titrimetric method.
- f. Iodine value of oil.

2. QUALITATIVE ANALYSIS.

- a. Reactions of simple sugars including glucose, fructose, galactose, mannose, pentose, maltose, sucrose, lactose, starch, glycogen and dextrin.
- b. Reactions of proteins - solubility, Biuret, Millon's xanthoproteic test, denaturation by heat, pH change and precipitation by acidic reagents. Color reactions of amino acids like tryptophan, tyrosine, cystine, methionine, arginine, proline and histidine.
- c. Reactions of lipids - solubility, saponification tests for unsaturations, Liebermann Burchard test for Cholesterol.

ALLIED I

(To choose any 1 out of the given 3)

BBC2.5 CHEMISTRY II

UNIT - I

1.1 Co-ordination Chemistry:

Nomenclature of co-ordination compounds - Werner Theory of Co-ordination Compound - Chelation - Functions and structure of Haemoglobin and Chlorophyll.

1.2 Industrial Chemistry:

Fertilizers and manures - Bio-fertilizers- Organic Manures and their importance - Role of NPK in plants - preparation and uses of Urea, Ammonium nitrate, potassium nitrate and super phosphate of lime.

1.3 Contents in Match sticks and match box - Industrial making of safety matches. Preparation and uses of chloroform, DDT, gamhexane and Freon.

UNIT - II

2.1 Carbohydrates:

Classification - structure of glucose - Properties and uses of starch - uses of Cellulose Nitrate - Cellulose acetate.

2.2 Amino Acid and Protein:

Classification of Amino Acids - preparation and properties of Glycine - Classification of Protein based on Physical properties and biological functions

2.3 Primary and Secondary structures of protein (Elementary Treatment only) composition of RNA and DNA and their biological role. Tanning of leather - alum (aluminum tri chloride tanning - vegetable tanning)

UNIT - III

3.1 Electro Chemistry:

Specific and equivalent conductivity - their determination - effect of dilution of conductance.

3.2 Kohlrawsh Law - Determination of dissociation constant of weak Electrolyte using Conductance measurement - Conductometric Titrations

3.3 PH and determination by indicator method - Buffer solutions - Buffer action - Importance of buffer in the living system - Derivation of Henderson equation.

UNIT - IV

4.1 Paints - Pigments - Components of Paint - Requisites of a good paint. Colour and Dyes - Classification based on constitution and application.

4.2 Vitamins:

Biological activities and deficiency diseases of Vitamin A, B, C, D, E and K - Hormones - Functions of insulin and adrenaline.

4.3 Chromatography - Principles and application of column, paper and thin layer chromatography

UNIT - V

5.1 **Drugs**- Sulpha Drugs - Uses and Mode of action of Sulpha Drugs – Antibiotics - Uses of Penicillin, Chloramphenicol, streptomycin. Drug abuse and their implication alcohol - LSD

5.2 **Anaesthetics** - General and Local Anaesthetics - Antiseptics - Example and their application. Definition and one example each for analgesics antipyretics, tranquilizers, sedatives, causes for diabetes, cancer and AIDS.

5.3 Electrochemical corrosion and its prevention - fuel cells.

BBC2.5 BIO-PHYSICS II

UNIT-I

Colloidal state 1: Size of colloidal particles. Different types of colloidal dispersion (sol, aerosol, emulsion, foam, gel). Preparation of lyophilic and lyophobic sols. Protective colloids, gold number. Stability of colloids. Precipitation coagulation, flocculation of colloidal particles. Colloidal particles of milk and blood with their functions.

UNIT-II

Colloidal state 2: Properties of colloids (surface tension, viscosity, surface absorption, detergent action, electrical, optical and kinetic properties). Phenomenon of osmosis and osmo regulation in the body. Electro osmosis, Donnan membrane equilibrium, its applications - artificial kidney(dialysis of blood). Biophysical and chemical composition of architecture of biomembrane (esp.cell membrane).

UNIT-III

Determination of molecular weight of macro molecules: By chemical composition, sedimentation, molecular sieving, light scattering and osmotic pressure methods.

Units of measurement of solutes in solution. eg. Normality, molarity, molality, milli equivalents and milli osmol, ionic strength. Examples for these concepts.

UNIT-IV

Biophysical basis for gaseous exchange in lungs and tissues partial pressure of CO₂ (pCO₂) and O₂ (pO₂). Influence of O₂ and CO₂ in RBC and body fluids during respiration. Physiological curve of formation and dissociation of oxyhemoglobin (HbO₂) and carbondioxide hemoglobin (HbCO₂). Various physiological factors in these curves.

UNIT-V

Application of Biophysical chemistry in chemical equilibria: Equilibrium constant, Law of mass action, Lechatlier Braun principle. Some simple system to illustrate chemical equilibria - formation and dissociation of NH₃, HI, CaCO₃. Biological application of chemical equilibria - Acid formation in stomach (hyper acidity and ulcer in stomach and duodenum) while using medicines like aspirin, paracetamol and antibiotics. Mechanism of neutralization of acid formed in digestive track by antacid drugs. Formation of stones in kidney and gall bladder.

Reference

1. Biophysics-Principles and Techniques-M.A. Subramanian, MJP Publishers, Chennai 5.
2. Biophysics-M.V. Volbenshtein, MIR publishers, Moscow, 1983.
3. Aspects of Biophysics-William Hughes, John Willey and Sons, N.Y., 1979.
4. Biophysical Science-L.E.Ackermann, L.B.E. Ellis and Williams, 1979.
5. Biophysics-Concepts and Mechanisms-E.J. Casey, Von Nostrand Reinhold co., N.Y., 1962.Affiliated to East-West press, New Delhi.

BBC2.5 BIO INSTRUMENTATION II

UNIT-I

Chromatographic techniques: General principles of chromatography. Principles, operational procedure and applications of paper, thin layer, ion exchange, molecular sieving, affinity and gas-liquid chromatography. High performance liquid chromatography (HPLC).

UNIT-II

Instrumental operation based on electromagnetic radiation-I: Basic principle, energy, wave length, wave number and frequency. Absorbance and emission spectra. Beer- Lambert's law, absorption and its transmittance.

UNIT-III

Instrumental operation based on electromagnetic radiation-II: Spectrophotometry- Principle, instrumentation and application with reference to assay of vitamins like thiamine and riboflavin.

Flame photometry: Atomic absorption and emission spectrophotometry- Principles, instrumentation and application (Sodium, Potassium analysis).

UNIT-IV

Radio isotope Techniques I: Atomic structure, radiation, type of radio active decay, half-life, and units of radioactivity. Detection and measurement of radioactivity - Methods based upon ionization GM counter, excitation (Scintillation counter).

UNIT-V

Radio isotope Techniques II: Auto radiography and isotope dilution techniques.

Application of radio isotopes in the elucidation of metabolic pathways, clinical scanning and radio dating, radio immuno assay.

Biological hazards of radiation and safety measures in handling radio isotopes.

References

1. Biochemical Guide to Principles & techniques of Practical Biochemistry - Keith Wilson & Kenneth Goulding, Cambridge Presss.
2. Principles & Techniques of Practical Biochemistry - Keith Wilson and John Walker, Cambridge Press.
3. Introduction to Practical Biochemistry - Shawney, Randhir Singh, Narasa Pub, N.Delhi.
4. Analytical Biochemistry - R.B Turner, Elsevier, N.Y.
5. Biomedical Instrumentation - M. Arumugam, Anuradha agencies, Chennai
6. Principles and Techniques of Practical Biochemistry-Bryan L. Williams & Keith Wilson, Cambridge Univ. Press.
7. Instrumental Methods of Analysis-Chatwal & Anand, Himalayan Publication.

BBC2.6P ALLIED PRACTICAL CHEMISTRY

VOLUMETRIC ANALYSIS

- 1) Estimation of hydrochloric acid using std. sulphuric acid
- 2) Estimation of Borax using std sodium carbonate
- 3) Estimation of sodium hydroxide using std sodium carbonate.
- 4) Estimation of FeSO₄ using std. Mohr salt Solution.
- 5) Estimation of Oxalic acid using std FeSO₄
- 6) Estimation of FAS using Std oxalic acid
- 7) Estimation of Fe²⁺ using diphenylamine / N phenyl anthranilic acid as indicator.

ORGANIC ANALYSIS:

Reactions of aldehyde (aromatic), carbohydrate, carboxylic acid (mono and dicarboxylic), phenol, aromatic primary amine, amide and diamide. Systematic analysis of organic compounds containing one functional group and characterizations by confirmatory tests.

BBC2.6P ALLIED PRACTICAL BIO-PHYSICS

EXPERIMENTS ON COLLOIDS AND GELS

1. Preparation of lyophobic and lyophilic sols.
2. Preparation and protective action of colloids.
3. Measurement of viscosity of a colloidal sol.
4. Preparation of gel (agar, gelatin or starch) and demonstration of diffusion.
5. Simple experiments involving dialysis.

EXPERIMENTS ON PROPERTIES OF LIQUID

Determination of surface tension and viscosity of water and body fluids (plasma, blood and C.S F.)

ESTIMATION OF pH.

Determination of pH of biological samples (blood, plasma, urine, saliva), phosphate buffer by glass electrode.

COLORIMETRIC ESTIMATION

1. Estimation of Protein by Biuret method
2. Estimation of amino acids by ninhydrin method
3. Estimation of hemoglobin cyanmethemoglobin method.

Books Recommended

1. Practical Clinical Biochemistry - Harold Varley, CBS, New Delhi.
2. Medical Laboratory Technology-Kanai L. Mukherjee, Tata McGraw Hill., Vol. I, II, III
3. Clinical Chemistry- Ranjana Chawla.
4. Laboratory manual in Biochemistry - Jayaraman.
5. Biochemical methods - S.Sadasivan and Manickam.
6. Introduction to Practical Biochemistry - David T. Plummer.

BBC2.6P ALLIED PRACTICAL BIO-INSTRUMENTATION

Spectrophotometric / Colorimetric Estimation:

1. Estimation of creatinine by Jaffe's method.
2. Estimation of urea by Diacetyl Monoxime method.
3. Estimation of glucose by O - Toluidine method.
4. Estimation of cholesterol by Zak's method.
5. Estimation of DNA.
6. Estimation of RNA.

Chromatographic separation:

1. Paper chromatographic separation and detection of amino acids and simple sugars.
2. Chromatographic separation of chlorophyll ii, carotenes of flower, p-pigments, proteins using column.
3. Separation of polar and non-polar lipids any thin layer chromatography.
4. Separation of proteins by SDS-PAGE.

Experiments Enzymes

1. Effect of pH, temperature and substrate concentration for amylase and urease.
2. Analysis of serum for Transaminases (SGOT, SGPT) activity and alkaline phosphatase activity.

References

1. Biochemical Guide to Principles & techniques of Practical Biochemistry - Keith Wilson & Kenneth Goulding, Cambridge Press.
2. Principles & Techniques of Practical Biochemistry - Keith Wilson and John Walker, Cambridge Press.
3. Introduction to Practical Biochemistry - Shawney, Randhir Singh, Narasa Pub, N.Delhi.
4. Analytical Biochemistry - R.B Turner, Elsevier, N.Y.
5. Biomedical Instrumentation - M. Arumugam, Anuradha agencies, Chennai
6. Principles & Techniques of Practical Biochemistry-Bryan L. Williams & Keith Wilson, Cambridge Univ. Press.
7. Instrumental Methods of Analysis-Chatwal & Anand, Himalayan Publication.

BBC2.7 VALUE EDUCATION

(For all UG Degree Courses)

UNIT-I

Value Education - Definition - relevance to present day - Concept of Human Values - self introspection - Self-esteem.

UNIT-II

Family values - Components, structure and responsibilities of family - Neutralization of anger - Adjustability - Threats of family life - Status of women in family and society - Caring for needy and elderly - Time allotment for sharing ideas and concerns.

UNIT-III

Ethical values - Professional ethics - Mass media ethics - Advertising ethics - Influence of ethics on family life - psychology of children and youth - Leadership qualities - Personality development.

UNIT-IV

Social values - Faith, service and secularism - Social sense and commitment - Students and Politics - Social awareness, Consumer awareness, Consumer rights and responsibilities - Redressal mechanisms.

UNIT-V

Effect of international affairs on values of life/ Issue of Globalization - Modern warfare - Terrorism. Environmental issues - mutual respect of different cultures, religions and their beliefs.

Reference Books

1. T. Anchukandam and J. Kuttainimathathil (Ed) Grow Free Live Free, Krisitu Jyoti Publications, Bangalore (1995)
2. Mani Jacob (Ed) Resource Book for Value Education, Institute for Value Education, New Delhi 2002.
3. DBNI, NCERT, SCERT, Dharma Bharti National Institute of Peace and Value Education, Secunderabad, 2002.
4. Daniel and Selvamony - Value Education Today, (Madras Christian College, Tambaram and ALACHE, New Delhi, 1990)
5. S. Ignacimuthu - Values for Life - Better Yourself Books, Mumbai, 1991.
6. M.M.M.Mascaronhas Centre for Research Education Science and Training for Family Life Promotion - Family Life Education, Bangalore, 1993.

WEBSITES AND e-LEARNING SOURCES:

www.rkmissiondhe.org/education.html/

www.clallam.org/lifestyle/education.html/

www.sun.com/./edu/progrmws/star.html/

www.infoscouts.com

www.secretofsuccess.com

www.1millionpapers.com

<http://militarilyfinance.umuc.edu/education/edu-network.html/>

SEMESTER -III

BBC3.3 BIOPHYSICAL AND BIOCHEMICAL TECHNIQUES I

UNIT-I

Units of measurements of solutes in solution, e.g. Normality, Molality, Molarity, Ionic strength, Millimoles. Osmosis, Osmotic pressure, Osmolarity and its application. Concept of isotonic, hyper and hypotonic solution and its importance in biology.

UNIT-II

Concept of pH, pOH, buffer and its application, buffer capacity. Henderson - Hasselbalch equation and its importance. Buffer in body fluids, Red blood cells, white blood cells, tissues and its role.

UNIT-III

Principle, instrumentation and applications of hydrogen electrode, glass electrode in determination of pH. Principle, instrumentation and applications of Clark oxygen electrode.

UNIT-IV

Principles of electrophoresis, factor affecting electrophoretic mobility - sample, electric field, supporting medium, composition of buffer. Sodium dodecyl sulphate, poly acrylamide gel electrophoresis (SDS- PAGE) and its application. Determination of molecular weight of protein by SDS PAGE.

UNIT-V

Principle, methodology and application of immuno electrophoresis. Tiselius moving boundary electrophoresis and its application in serum protein separation. Principle, methods and application of Agarose gel electrophoresis.

References :

1. A Biochemical Guide To Principles And The Techniques Of Practical Biochemistry- Keith Wilson And Kenneth Goulding, Cambridge Press.
2. Principles And Techniques Of Practical Biochemistry- Keith Wilson And John Walker, Cambridge Press.
3. Introduction To Practical Biochemistry - Shawney, Randhir, Singh, Narasr Pub, N.Delhi.
4. Analytical Biochemistry - R.B. Turner, Elsevier, N.Y.
5. Biomedical Instrumentation - M. Arumugam, Anuradha Agencies, Chennai.
6. Principles And Techniques Of Practical Biochemistry - Bryan L, Williams And Keith Wilson, Cambridge Univ, Press.
7. Instrumental Methods of Analysis - Chatwal And Himalayan Publication.
8. Biophysical Chemistry - Upadhyay and Upadhyay Nath, Himalayan Publication.

ALLIED II

(To choose any 1 out of the given 3)

BBC3.5 ZOOLOGY I

Objective :

To study the systemic and functional morphology of invertebrates and Chordates.

UNIT-I

Study types including Life histories. Protozoa - Entamoeba, Porifera-Sycon. Coelenterata-Obelia geniculata. Platyhelminthes-Taenia solium

UNIT-II

Annelida-Earthworm, Arthropoda-Prawn, Mollusca-Fresh water mussel, Echinodermata-Sea Star.

UNIT-III

Chordata-Prochordates , General Characters, Morphology of Amphioxus Vertebrates : Shark.

UNIT-IV

Type Study Frog and Calotes.

UNIT-V

Type Study Pigeon and Rabbit.

Note: In chordata to study only morphology, digestive system, Respiratory system, circulatory system and urinogenital system.

References :

1. Ayyar, E.K. and T.N. Ananthakrishnan, 1992. Manual of Zoology. Vol. [Chordata] I & II.S. Viswanathan [Printers and Publisher] Pvt. Ltd., Madras, 891p.
2. Kotpal Series, 1988-1992. Rastogi Publication, Meerut.
3. Jordan E.L. and P.S. Verma 1993. Invertebrata Zoology 12th Edition. S. Chand Co. Ltd., New Delhi

BBC3.5 MICROBIOLOGY I

UNIT-I

Definition and scope of Microbiology, History and Recent Developments, Spontaneous generation, Biogenesis, Contribution of Louis Pasteur, Leewen Holk, Lazzarn - Spallanzani, John Tyndall, Joseph Lister, Robert Koch, Microscopy - Simple, Compound, Light Microscopy Dark ground, Phase contrast, Flurescence and Election microscopy.

UNIT-II

Five Kingdom consept cell Theory, Binomial Nomendature of microbes, species concept, classical approach with examples, Anatomy of Prokaryotes and Eukaryotes, ultra structure and function of cellwall and cell organelles.

UNIT-III

Culture Techniques, Media preparation, Preservation of cultures, Aerobic and Anaerobic culture techniques, Microbial morphology - wet mount, Hanging drop staining methods, Dyes, Simple - Differential and Special staining techniques Acid fast staining spore stain, Capsule stain, staining for met achromatic Granules, Development of Laboratory Techniques for pure and Mixed culture.

UNIT-IV

Antimicrobial chemotheraphy - Antibiotics - source, classification mode of action - Antimicrobial resistance - Tests for Sensitivity to Antimircrobial agents and its Quality control classical techniques of Microbial identification - Morphological, Physiological and Biochemical properties.

UNIT-V

Measurement of microbial growth Batch and continuous culture, Growth Determination - Growth curve. Structural characteristics of algae - Cholrella, Fungi - Mucor and Protozoa - Entamoeba.

BBC3.5 STATISTICS FOR LIFE SCIENCES I

Objective

To apply Statistical Techniques for Bio-Sciences.

UNIT-I

Nature and Scope of statistical methods and their limitations-Collection, Classification, Tabulation of Statistical data - uses of frequency table -Diagrammatic and Graphical Representation of Statistical data.

UNIT-II

Measure of Central Tendency-Mean, Median, Mode, and their Merits and Demerits.

UNIT III

Measure of Dispersion - Range, Mean Deviation, Quartile Deviation, Standard Deviation, Co-efficient of Variation - Skewness - Karl Pearson's and Bowley's Coefficient of Skewness.

UNIT IV

Events and Sets - Sample Space - Concept of Probability - Addition and Multiplication Theorem on Probability - Conditional Probability - Independence of Events.

UNIT-V

Bivariate Frequency Table and its Uses - Correlation Analysis-Scatter diagram - Karl Pearson's Correlation Coefficient - Spearman's Rank Correlation - Regression Analysis

- Regression lines - Fitting of Straight line using Method of Least Squares.

Note : The proportion between theory and problems shall be 20:80

Books for Reference

1. Sunder Rao - Bio statistics.
2. Zar. J-Bio statistical analysis, Prentice Hall of India.
3. S. C. Gupta of V.K.Kapoor - Fundamental of Mathematical Statistics, Sultan & Sons.
4. Scholes, W.L-Statistics for bio logical sciences, Addison Wesley.
5. S. P. Gupta - Statistical Methods, Sultan Chand & Sons
6. Lewis, A .E (1971)-Bio-Statistics
7. Daniel : Bio-Statistics, John Wiley & Sons

SKILL BASED COURSE I
BBC3.7 FUNDAMENTALS OF COMPUTER

UNIT-I

Computer fundamentals - Introduction, Definition, importance, uses & Advantages. Binary number system, types of computer, computer language, package, operating system, network. Difference between computer and human being.

UNIT-II

Classification of computers- digital, analog, hybrid, micro, mini and super computers. Generation of computer, personal and advance computers and its types. Microsoft windows- windows fundamental. Managing the file system, printing in windows, windows accessories, control panel.

UNIT-III

Memory unit- primary and Auxiliary. Computer hardware- Input unit, Central processing Unit (CPU), output unit, UPS and external modem. MS Word- Introduction, starting MS Word, Standard menus–file, edit, view, Formatting a text, layouts, inserting a diagram, graph, page numbers, borders, bullet & numbering, spelling and grammar, letter and mailing, mail merge, tables and its applications.

UNIT-IV

MS Excel- - Introduction, starting MS excel, creating a worksheet, page setup, print area, paste special, formula. Insert & formatting- cells, rows, columns and sheets. Functions, hyperlink, pivot charts, sorting, filters, header and footers, formula bars, status bar, options and its application.

UNIT-V

MS Power point- - Introduction, power point file types, creating a presentation, using color schemes, viewing a presentation, managing slide shows , adding pictures, transition effects, animations, action setting and action buttons and its application. Introduction to HTML- program using HTML Tags, application & limitations.

References:

1. Computer fundamental, V.K. Jain
2. Working in Microsoft office, Ron Mansfield
3. Multimedia, System design, Prabhat k. Andleigh, Kiran Thakrar.
4. Internet & World Wide Web, third edition, Dietel, Dietel, Gold Berg.
5. Programming in C, Balaguru Samy.

NON MAJOR ELECTIVE I

BBC3.8 DIAGNOSTIC BIOCHEMISTRY I

UNIT-I

Specimen collection and processing (Blood, urine, feaces), anti-coagulant and preservatives for blood and urine. Transport of specimens.

Units of measurements of solutes in solution, e.g. Normality, Molality, Molarity, Osmolarity, Ionic strength. Examples of this concept. Osmosis and its application. Isotonic solution, hyper and hypotonic solution.

UNIT-II

Blood sugar level - factors controlling blood sugar level - hypo, hyper glycemia, Diabetes mellitus, types - GTT.

UNIT-III

Metabolism of Bilirubin- Jaundice - types differential diagnosis and liver function tests.

UNIT-IV

Renal functional test - clearance test - Urea, Creatinine, Inulin, PAH test, concentration and dilution test.

UNIT-V

Gastric functional tests - collection of gastric contents, examination of gastric residues, FTM stimulation test, tubeless gastric analysis.

SEMESTER-IV

BBC4.3 BIOPHYSICAL AND BIOCHEMICAL TECHNIQUES II

UNIT-I

General principle of chromatography. Partition and adsorption chromatography. Principle, operation procedure and applications of paper chromatography and their types. Principle, instrumentation, application of thin layer chromatography, ion exchange chromatography, and molecular gel exclusion chromatography and its application in separation of macromolecules.

UNIT-II

Basic principle of centrifugation techniques, sedimentation rate, Svedberg unit/ sedimentation coefficient. Preparative ultracentrifuge, Differential centrifugation, density gradient centrifugation, rate zonal, isopycnic isodensity, equilibrium isodensity centrifugation. Analytical ultracentrifuge method - determination of molecular weight by sedimentation in an ultracentrifuge.

UNIT-III

Basic principle of electromagnetic radiation, energy, wavelength, wave number, frequency. Absorption and emission spectra. Beer lambert's law. Basic principle, instrumentation, application of colorimetry techniques. Principle, instrumentation, application of UV- visible spectroscopy.

UNIT-IV

Principle, instrumentation of spectrofluorimetry techniques. Principle, instrumentation, application in atomic absorption spectroscopy. Principle, instrumentation of flame photometry. Application in analysis of trace elements- sodium and potassium.

UNIT-V

Radiation, type of radioactive decay, half-life, unit of radioactivity.

Detection and measurement of radioactivity - Methods based upon ionization (GM Counter), excitation(Scintillation counter).

Autoradiography and isotope dilution techniques.

Application of radioisotopes in the elucidation of metabolic pathways, clinical scanning and radio dating, RIA.

Biological hazards of radiation and safety measures in handling radio isotopes.

References:

1. A Biochemical Guide To Principles And The Techniques Of Practical Biochemistry - Keith Wilson And Kenneth Goulding, Cambridge Press.
2. Principles And Techniques Of Practical Biochemistry- Keith Wilson And John Walker, Cambridge Press.
3. Introduction To Practical Biochemistry - Shawney, Randhir, Singh, Narasr Pub, N.Delhi.
4. Analytical Biochemistry - R.B. Turner, Elsevier, N.Y.
5. Biomedical Instrumentation - M. Arumugam, Anuradha Agencies, Chennai.
6. Principles And Techniques Of Practical Biochemistry - Bryan L, Williams And Keith Wilson, Cambridge Univ, Press.
7. Instrumental Methods Of Analysis - Chatwal And Himalayan Publication.
8. Biophysical Chemistry - Upadhyay And Upadhyay Nath, Himalayan Publication.

BBC4.4P CORE PRACTICAL II

1. VOLUMETRIC ANALYSIS

- a. Use of potassium permanganate in the estimation of iron, oxalate and nitrite.
- b. Estimation of calcium from biological fluids like blood, milk and urine.
- c. Use of potassium permanganate in the standardization of sodiumthiosulphate and estimation of copper by Iodimetry.
- d. Estimation of chloride by Mohr's method.
- e. Estimation of chloride by Volhard's method.

2. BIOCHEMICAL PREPARATIONS

- a. Preparation of Starch from potatoes.
- b. Preparation of Casein and Lactalbumin from milk.
- c. Preparation of Albumin from egg.

3. PREPARATION OF BUFFERS

Phosphate buffer, Tris buffer and Citrate buffer.

4. Colorimetric Estimation

- a) Estimation of inorganic phosphorus by Fiske and Subbarow method.
- b) Estimation of Amino acid by Nindyrin method.
- c) Estimation of Protein by Biuret method.

ALLIED II

(To choose any 1 out of the given 3)

BBC4.5 ZOOLOGY II

Objective :

To study the principles of Cell biology, Genetics, Developmental Biology, Physiology, Ecology and Evolution.

UNIT-I

Cell Biology-Structure of animal cell Genetics : Molecular structure of genes - Gene function. Genetic Engineering and its application, sex linked inheritance.

UNIT-II

Embryogenesis - Cleavage and gastrulation of Amphioxus. Human Physiology: Excretion - kidney failure and transplantation.

UNIT-III

Diseases of Circulatory system - Blood Pressure, Heart diseases-Ischemia, Myocardial infarction, Rheumatic heart diseases, Stroke.

UNIT-IV

Pollution - Environmental degradation, methods of sewage treatment, effluents, solid wastes and recycling process - Greenhouse effect - Global warming - Acid Rain.

UNIT-V

Evolution Theories - Lamarkism & Darwinism.

References :

1. Ekambarantha Ayyar, and Ananthkrishnan, T.N. 1993 Outlines of Zoology, vol I & II Viswanathan and co Madras.
2. Sambasiviah I, Kamalakara Rao. A.P. Augustine Chellappa, S [1983] Text Book of Animal Physiology, S. Chand & Co., New Delhi.
3. Verma and Agarwal [1983] Text Book of animal Ecology, S. Chand & Co., New Delhi.
4. Verma and Agarwal and Tyagi [1991] Chordate Embryology S. Chand & Co. New Delhi.
5. Rastogi and Jayaraj [2000] Text Book of Genetics. Rastogi Publications, Meerut
6. Verma and Agarwal 2000 Cell Biology, Genetics, Molecular Biology, Evolution and Ecology, S. Chand & Co

BBC4.5 MICROBIOLOGY II

UNIT-I

Soil Microbiology - Soil structure, Soil formation, Characterisation of Soil Types and importance, Bio fertilizers.

UNIT-II

Aquatic Microbiology, Sewage Treatment - Physiological and Biological. Microbes in air, Distribution and Source of Airborne Organisms.

UNIT-III

Food Microbiology, Microbial Spoilage of food, food preservation techniques, Microbes in Milk and their source, Pasteurisation techniques. Industrial Production - Pencillin.

UNIT-IV

Morphology, Classification, Characteristics Pathogenecity, Laboratory diagnosis and prevention of Infections caused by following organisms mycobacteria, dermatophytes, Hepatitis, Entamoeba histolytica, Antigens - Antibody reactions.

UNIT-V

Biotechnology - Definition of a Gene, structure, Cloning Techniques, Genomic library. Nan technology - SCP production. Gene Therapy methods.

BBCT4.5 STATISTICS FOR LIFE SCIENCES II

Objective

To apply Statistical Techniques for Bio-Sciences.

UNIT-I

Concept of Random variables and distributions - standard distributions -Binomial, Poisson and Normal distributions.

UNIT-II

Concept of sampling distributions-standard error-asymptotic and exact tests based on normal, t, chi-square and F distributions.

UNIT-III

Principles of Scientific Experimentation- Randomization, Replication and local Control

- Analysis of Variance - One way and Two way Classification - Completely Randomized Design, Randomized Block Design and Latin Square Design.

UNIT-IV

Non-parametric tests - Run, Median, Sign, Mann - Whitney and Wilcoxon - Signed Rank Test.

UNIT-V

Introduction to Vital Statistics - Simple Mortality and Fertility Rate-Birth rate and life Tables.

Note : The proportion between theory and Problems shall be 20:80

Book for Reference

1. Sunder Rao-Bio Statistics.
2. Zar.J-Bio Statistical Analysis, Prentice Hall of India.
3. S.C.Gupta of V. K.Kapoor-Fundamental of Mathematical Statistics, Sultan Chand & Sons.
4. Scholes, W.l - Statistics for Biological Sciences, Addison Wesley.
5. S. P. Gupta - Statistical Methods, Sultan Chand & Sons.
6. Lewis, A .E (1971)-Bio-Statistics.
7. John Fruend : Mathematical Statistics, Prentice Hall of India.

BBC4.6P ALLIED PRACTICAL ZOOLOGY

MAJOR PRACTICAL

CD*/Model/Chart - Anatomical observation and comment Cockroach - Digestive and nervous system.

Frog - Digestive and Urino-genital system. Arterial system & Venous system

MINOR PRACTICAL

Slides / Model / Chart - Identification (draw and label)

1. Body setae of Earthworm
2. Mouth parts of mosquito
3. Mouth parts of Honeybee
4. Any one suitable / relevant vertebrate Brain
5. Placoid scale of shark

Spotters

Entamoeba, Sycon, Obelia, Taenia solium (entire, scolex) earthworm (entire, Pineal setae) Prawn [entire], Fresh water mussel, Sea star, T.S. of arm of sea star to show tube feet, shark-entire, Shark [placoid scale] Frog, Calotes Pigeon entire [feather], Rabbit

Sphygnomanometer

* References:

1. Prof. Baskaran, HOD of Zoology Iyyanadar Janagiammal College Sivakasi, Ph.No. 04562 - 254100
2. WWW.Prodissector.Com.
3. WWW.Sciencelass.Com.
4. WWW.ento.vt.edu.

BBC4.6P ALLIED PRACTICAL MICROBIOLOGY

1. Clearing of glassware, sterilization techniques.
2. Gram stain, Motility (Hanging drop)
3. Enumeration of soil microbes.
4. Enumeration of sewage microbes.
5. Assessment of milk quality by MBET test.
6. Streak plate, pour plate techniques.
7. Isolation of puncture techniques.
8. Wet mount preparation fungal material.
9. Serial dilution techniques.
10. Slant preparation.
11. Study of SCP, blue greens algeae
12. Assessment of Air quality
13. Plant viral diseases like TMV, Tomato milting HIV, Virus structure diseases.
14. Micro photographs in Biotechnology of Microbes and Microbial products demonstration and identification.
15. Diseases like Tuberculosis, Cholera, diphtheria demonstration identification.
16. Medically important pathogens micro photographs demonstration.
17. Root Nodules Rhizobium isolation and identification methods.

ALLIED PRACTICAL
BBCP4.6P STATISTICS FOR LIFE SCIENCES

Note

Use of scientific calculator shall be permitted for practical examination. Statistical and Mathematical tables are to be provided to the students at the Examination Hall.

1. Construction of Univariate and Bi-Variate distributions with Sample size not exceeding 100.
2. Graphical and diagrammatic representation of data.
3. Numerical computation of measures of central tendency, measures of dispersion-measure of Skewness.
4. Fitting of Binomial and Poisson distributions and testing its goodness of fit.
5. Computation of correlation, Rank correlation and Regression equations.
6. Exact test based on t, F and chi-square distributions.
7. Chi-square test for independence of attributes and its applications to biological studies.
8. Analysis of variance-one way, two way Classification.
9. Completely Randomized Design, Randomized Block Design and Latin Square Design.
10. Non - parametric tests.

P.S.* The syllabus content involves more of Technical aspects of Statistical methods, only statistics faculty alone can be appointed as Examiners.

Book for Reference

1. Sunder Rao-Bio statistics.
2. Zar.J-Bio Statistical Analysis, Prentice Hall of India.
3. S.C.Gupta & V. K.Kapoor-Fundamental of Mathematical Statistics, Sultan Chand & Sons.
4. Scholes, W.I-Statistics for Bio logical Sciences, Addison Wesley.
5. S. P. Gupta - Statistical Methods.
6. Lewis, A .E (1971)-Bio-statistics.
7. Daniel .E. Bio Statistics, John Wiley.

SKILL BASED COURSE II BBC4.8

COMPUTER APPLICATIONS

UNIT- 1

Operating system - MS DOS, DOS Features, MS DOS opening and closing, DOS commands, Batch Files. Windows XP- opening and closing, background setting, date and time adjustment, note pad, word pad, painting. Unix features & commands.

UNIT- 2

Computer Language - Types, Introduction to C and Importance, constants, variables, data types, declaration of variables. Operators - Arithmetic, relational, logic, assignment and conditional operators. Introduction to Arrays and pointers.

UNIT -3

Internet - introduction, importance, requirements for internet. Electronic mailing, chatting, search engine, web pages. Multimedia - introduction, applications, components and its uses. Multimedia design, multimedia concept.

UNIT-4

Computer maintenance - causes of failure, components failure, temperature and humidity, dust and other particle, power line problems. computer virus- introduction, types, symptoms, virus avoiding methods, antivirus programs.

UNIT- 5

Computer application in banking, industries, educational institutions, hospitals, Research institutions - ISRO, BARC. Network - local area network, wide area network. Introduction to telecommunication. Downloading software and files, copying CD/DVD.

References :

1. Computer fundamental, V.K. Jain
2. Working in Microsoft office, Ron Mansfield
3. Multimedia, System design, Prabhat k. Andleigh, Kiran Thakrar.
4. Internet & World Wide Web, third edition, Dietel, Dietel, Gold Berg.
5. Programming in C, Balaguru Samy.

NON MAJOR ELECTIVE II

BBC4.9 DIAGNOSTIC BIOCHEMISTRY II

UNIT-I

Inborn errors of metabolism - Alkaptonuria, Phenyl ketonuria, Cystinuria, Galactosemia, Fanconi's syndrome and Albinism.

UNIT-II

Plasma enzymes in diagnosis - Functional and non functional plasma enzymes - Isoenzymes. Myocardial Infarction, acute pancreatitis, liver diseases and muscle wasting.

UNIT-III

Cholesterol - importance, Lipoproteins - Factor affecting blood cholesterol - Atherosclerosis, Risk factor.

UNIT-IV

Iron absorption and excretion - Anemia - classification. Sickle cell anemia and Talassemia .

UNIT-V

Hormones - Definition and classification- Thyroid hormone- thyroid function test, male sex hormones and female sex hormone.

References:

1. Clinical chemistry in Diagnosis & Treatment - P.D. Mayne, ELBS/ Arnold, N.Delhi.
2. Clinical chemistry - W.J. Marshall and S.K. Bangert [1995]
3. Textbooks of medicine - K.V. Krishnedas [1996], Jaypee Brothes.
4. Principles of internal medicine [1998] - Harrison, T.R. Fauci, Branuwalad and Isselbaeher, McGraw Hills.
5. Clinical Biochemistry with clinical correlation - Devin, Wiley.
6. Practical clinical biochemistry - Harold Varley, CBS, New Delhi.
7. Medical Laboratory technology - kanai L. Mukherjee, Tata McGraw Hill Publication and Co. ltd., vol. I, II, III.
8. Clinical chemistry in diagnosis and treatment, Joan F. ZilvaA, PR Pannall, Llyods - Luke [medical Books ltd., Lon
9. Biochemistry - U.Sathyanarayana & U. Chakrapani, Third edition, Book and Allied (p) ltd.
10. Text book of medical biochemistry - Fourth edition- MN. Chatterjee, Rana Shine, jaypee Publisher.

SEMESTER -V

BBC5.1 ENZYMES AND INTERMEDIARY METABOLISM

UNIT-I: Enzymes

Definition, units, various classifications, nomenclature, specificity, isoenzymes, factors affecting enzyme activity - pH, temperature, enzyme concentration. Lock and key mechanism, Michaelis menten equation, Line weaver Burk plot. Enzyme inhibition - competitive, Non competitive, Uncompetitive (Concepts with example).

UNIT-II: Carbohydrates metabolism

Electron transport chain and Oxidative phosphorylation, High energy compounds. Glycolysis, Glocogenesis and glycogenolysis, Citric acid cycle, Gluconeogenesis, HMP shunt.

UNIT-III: Lipid metabolism

Biosynthesis of fatty acid, cholesterol, triglycerides and phospholipids. Degradation of fatty acids by β - oxidation. Phospholipids and formation of ketone bodies.

UNIT-IV: Protein Metabolism

Degradation of proteins, Oxidative, Non- Oxidative deamination and decarboxylation of amino acids, Urea Cycle and Creatinine formation.

UNIT-V: Nucleic acid metabolism

Biosynthesis and degradation of purine and pyrimidine nucleotides, uricotelic and urotelic system, inhibitors of nucleotides biosynthesis.

BOOKS RECOMMENDED

1. Enzymes - Dixon and Webb
2. Understanding enzymes - palmer
3. Enzyme kinetics - Saegel
4. Lehninger's principles of Biochemistry - Nelson and cox
5. Lippincoot's Biochemistry - P.C. Champe
6. Harper's Biochemistry - Murray
7. Biochemistry - Voet and Voet

BBC5.2 GENETICS AND MOLECULAR BIOLOGY

UNIT-I

Mendelian genetics: Mendel's laws of inheritance, test cross, back cross and laws incomplete dominance

UNIT-II

DNA as genetic material, highly repetitive, moderately repetitive and unique DNA sequences. Types of replication, evidence for semi conservative replication. Replication in prokaryotes and inhibitors of replication. DNA polymerases I, II, III, topoisomerases, Okazaki fragments, DNA ligases. Reverse transcriptase, retroviruses, satellite DNA and Cot value.

UNIT-III

Prokaryotic transcription central dogma, RNA polymerases, role of sigma factor, initiation, elongation and termination. (Rho - dependent and independent). Inhibitors of transcription, post transcriptional modification of prokaryotes. Basic concept of one gene - one enzyme hypothesis.

UNIT-IV

Translational activation of amino acids, initiation, elongation and termination of protein synthesis in prokaryotes. Inhibitors of protein synthesis. Post translational modification of proteins. Genetic code - definition, deciphering and silent features of genetic code, composition of pro and eukaryotic ribosome, structure of t-RNA , coding and non coding strands of DNA role of signal peptides.

UNIT - V

DNA repair mechanism-excision, SOS and UV repair. Prokaryotic gene regulation- Operon, Lac operon , positive and negative control. Gene mutation types, point mutation, transition transversion frame shift, insertion and deletion.

References.

1. Genes VIII 2004. Benjamin Lewin, Oxford Univ press.
2. Cell and Molecular Biology - 3rd Editioin (2002).G Karp. John Wiley and Sons N.Y
3. Molecular cell biology - David Freifelder 2nd Edition, Narosa publishing House.
4. Lehinger's principle of Biochemistry (2000), Nelson and Cox.
5. Harper's Biochemistry - Rober K. Murray, Daryl K.Grammer, McGrawHill, Lange Medical Books
6. Biochemistry of Nucleicacids - Adam et al
7. Molecular biology - SC Rastogi CBS publishing 2nd Edition
8. Cell biology and Genetics - P.S. Verma and V.K.Agarwal, S. Chand publication
9. Advance molecular cell biology - R.M.Twyman.W.wisden Viva book House Yadav - Ist Edition 1998.
10. Genetics - Manju yadav Ist Edition 2003, Discovery publishing House.

BBC5.3 HUMAN PHYSIOLOGY AND NUTRITION BIOCHEMISTRY

UNIT-I: Respiratory and Circulatory System:

Components of transport of Oxygen and Carbon dioxide, Role hemoglobin in transport. Mechanism of respiration, Chloride shift, Bohr's effect. Introduction, function, types, of Circulatory organ. Design of Blood vessels, Blood Flow, blood pressure, Cardiac muscle, ischemic disease.

UNIT-II: Digestive and excretory system

Components of Digestive system, Digestion, absorption of carbohydrates, protein, lipids. Mechanism of HCL formation, Role of various enzymes involved in digestive process. Structure and function of kidney, Mechanism of urine formation, Glomerular filtration rate (GFR).

UNIT-III: Endocrine and Nervous System

Brief outline of various endocrine glands and their secretion, physiological role of hormones. Nervous system - Brain, spinal cord, nerve cells, and nerve fibers. Synapse, chemical and electrical synapses, nerve impulses, action potential and neurotransmission.

UNIT-IV: Nutrition and Dietary System

Definition of food nutrition, basic food groups, Physiological role and nutritional significance of carbohydrates, protein, lipids, vitamins and minerals. Protein malnutrition (Kwashiorkar) and undernutrition (marasmus) and their preventive, curative measures.

UNIT-V: Nutritive and Calorific Value of Food.

Unit of energy measurements of food stuffs by Bomb calorimeter, calorific value and RQ of food stuffs. Basic metabolic rate (BMR), its measurements and influencing factors, SDA of food. Nutritive value of protein, essential amino acid. Composition of balanced diet for infants, pregnancy and lactating women, old age.

Reference

1. Human physiology, 2nd edition- BJ Mejer, HS Meij, AC Meyer, AITBs publishers and distributors.
2. Cell physiology by Giese, 5th edition, W.B saunderscompany, Tokyo, Japan.
3. A text book of animal physiology, KA Goel, KV Sastri, Rastogi publications Meerut.
4. Animal physiology and Biochemistry- RA Agarwal, Anil. K, Srivastava, Kausshal Kumar, S. Chand & Co.
5. A Hand Book of Basic Human physiology- K. Saradha subramanyam, S. Chand & Co., Ltd.
6. Guide to physiology- Y. Rajakshmi, S. Chand & Co., Ltd.

ELECTIVE I

BBC5.6 MEDICAL LABORATORY TECHNOLOGY I

UNIT-I: Laboratory care and instrumentation

Code of conduct for laboratory personnel - safety measures in the laboratory- chemical/Reagents, labelling, storage and usage. First Aid in laboratory accidents - Precautions and first aid equipments.

UNIT-II: Laboratory equipments.

Working of microscope - Phase contrast, Fluorescence, Electron microscope. Centrifuge, analytical balance, colorimeter - Usage and care. Glass wares, serological water bath, incubator.

Reporting laboratory tests and keeping records. Sterilization, preparation of reagents. General approach to quality control, quality control of quantitative data.

UNIT-III: Urine Analysis

Composition, collection, preservation, gross examination, interfering factors, chemical examination. Significance of sugar in urine, ketone bodies in urine, bile pigments, hematuria, uric acid, microscopic examination of the urinary sediment.

UNIT- IV: Stool Examination

Specimen collection- inspection of faeces- odour, pH, Interfering substance. Test for occult blood, faecal fat, microscopic examination of stool specimen.

UNIT-V: Clinical Hematology

Collection of blood - Anticoagulant, preservation, Estimation of Hb, PCV<WBC<RBC, Platelets, ESR. Clotting time, bleeding time - normal value, clinical interpretation. Blood grouping

SKILLED BASED COURSE III BBC5.7

BIOSTATISTICS I

UNIT-I

Nature and scope of statistical methods and their limitations. Collection, classification, tabulation of statistical data.. Organization of data - Individual series, discrete series, continuous series / class interval. Diagrammatic and graphical representation of statistical data (bar diagram, line diagram, pictogram, histogram & horizontal and vertical bar diagram).

UNIT-II

Measure of central tendency - Introduction, Characteristics of a good average, Mean, Median, Mode (Raw, Discrete & Continuous data) Merits and demerits.

UNIT-III

Measure of Dispersion- Introduction, definition, classification & properties. Range - Introduction, definition, location of range in individual, discrete, continuous series, merits and demerits of Range. Standard deviation, Variance, Coefficient of Variation.

UNIT- IV

Probability - Introduction, Definition, Kinds of Probabilities. Sample Space - Addition and Introduction, definition of mean deviation, quartile deviation – simple problems. Permutation and Combination - Definition, Factorial symbol, formula with example.

UNIT-V

Correlation Analysis - Introduction, Definition, uses, correlation and causation, kinds of correlation. Types of correlation - Positive and negative, linear and non linear, simple and multiple, partial and total correlation.

Books for References:

1. Sundar Rao - Biostatistics.
2. Daniel - Biostatistics, John wiley & sons
3. Lewis, A. E (1971) - Biostatistics
4. Gupta S.P,(1997) Biostatistical Methods, S. Chand & Sons
5. Sundar Rao P.S.S, Jesudian.G& Richard.J [1987], An Introduction for Biostatistics [2nd edition] Prestographit, vellore, India
6. Biostatistics - P. Rama Krishna, Saras Publication [1995].
7. elhance D.N [1972], Fundamentals of statistics kitab mahal, allahabad.
8. Lewis, A.E [1971]- Bio-Statistics.
9. Daniel: Biostatistics, John Wiley 7 Sons.
10. Zar. J - BioStatistical analysis, prentice Hall of India.

SEMESTER-VI

BBC6.1 CLINICAL BIOCHEMISTRY

UNIT-I: Basic concepts of Clinical Biochemistry

A brief review of units and abbreviations used in expressing concentrations and standard solutions. specimen collection and processing (Blood, urine, faeces). Anti- coagulant preservatives for blood and urine. Transport of specimens.

UNIT-II: Diseases related to carbohydrate metabolism

Regulation of blood sugar, Glycosuria - types of glycosuria. Oral glucose tolerance test in normal and diabetic condition. Diabetes mellitus and Diabetic insipidus - hypoglycemia, hyperglycemia. Ketonuria, ketosis.

UNIT-III: Inborn errors of metabolism

Introduction - clinical importance, phenyl ketonuria, cystinuria, alkaptonuria, Fanconi's syndrome, galactosemia, albinism, tyrosinemia, and hamophilia.

UNIT-IV: Organ function test

Lipid and lipoproteins: Classifications, composition, mode of action - Cholesterol. Factors affecting blood cholesterol level. Dyslipoproteinemias, IHD, atherosclerosis, risk factor and fatty liver.

Liver function test: Metabolism of bilirubin, jaundice - types, differential diagnosis. Liver function test - Icteric index, Vandenberg test, plasma protein changes, PT.

Renal function test : Clearance test – Urea, Creatinine, Inulin, PAH test, Concentration and dilution test.

Gastric function test : Collection of gastric contents, examination of gastric residuum, FTM, stimulation test, tubeless gastric analysis.

UNIT-V

Clinical enzymology

Functional and non- Functional plasma enzymes. Isoenzymes with examples. Enzyme patterns in acute pancreatitis, liver damage, bone disorder, myocardial infarction and muscle wasting.

BOOK RECOMMENDED

1. Text book of Clinical Biochemistry - Carl A. Burdis and Edward R Ashwood
2. Text book of Medical Biochemistry - Dr. M.N. Chatterjee and rane shinde
3. Clinical chemistry in diagnosis and treatment - Philip D. Mayne
4. Clinical chemistry – William Hoffman
5. Clinical Biochemistry with clinical correlation – Devin, Wiley
6. Practical

BBC6.2 BIOTECHNOLOGY

UNIT-I

Biotechnology: Definition and scope, types and branches of biotechnology. Genetic engineering tools - Restriction endo nucleases, SI nucleases, DNA ligases, Alkaline phosphatase, Reverse transcriptase, DNA polymerase, poly nucleotide kinase, terminal transferase. Use of Linkers and Adapters. Cloning vectors: Plasmid, Cosmid, Phage, YAC, Binary vector, Shuttle vector and Expression vectors.

UNIT-II

Methods of gene transfer - transfection, electroporation. Recombinant selection and screening methods, Insertional inactivation. Techniques of cloning - Southern, Northern and Western blotting techniques, DNA hybridization techniques. Gene amplification PCR.

UNIT-III

Plant tissue culture - Media composition, nutrients, growth regulators, initiation and differentiation. Callus and suspension culture. Micro propagation, Somatic embryo genesis and somoclonal variation. Protoplast isolation, protoplast fusion and regeneration of plants.

UNIT-IV

Equipment and requirements for animal cell culture, laminar flow, CO₂ incubator, natural media, synthetic media, substrate for cell culture, substrate treatment, desegregations of tissues, establishment of cell culture

UNIT-V

Transgenic plant and transgenic animal, Herbicide resistant, stress resistant, pesticide resistant and insect resistant, transgenic plant, transgenic fish and transgenic sheep. Valuable product from animal cell culture - Tissue plasminogen activator (TPA). Hybridoma technology - monoclonal antibodies.

Books Recommended:

1. Concept in biotechnology - D. Balasubramiam et al., Universal press India 1996.
2. Plant tissue culture - Razdan, Oxford IBH Publisher.
3. Animal cell culture - Freshney, IRL Press.
4. Animal Biotechnology - 2005. A.K. Srivastava, R.K. Singh and M.P. Yadav Oxford & IBH.
5. Molecular biotechnology 2006 - Channarayappa Univ. Press
6. Molecular Biology & Biotechnology - H.D. Kumar(1997), Vivas publishing house Pvt .Ltd
7. Molecular biotechnology - principle and application of recombinant DNA 3rd edition Bernard, R. Glick Jack, J. Pasternak 2003, Library of Congress cataloging in publication data.
8. A text book of Biotechnology - R. C. Dubey, S. Chand & co
9. Biotechnology - Prakash, S. Lohar, MJP publisher, Chennai -5.

BBC6.3P CORE PRACTICAL III

1. COLORIMETRIC ESTIMATION

- b. Estimation of Creatinine by Jaffe's method.
- c. Estimation of urea by Diacetyl monoxine method.
- d. Estimation of DNA.
- e. Estimation of RNA.
- f. Estimation of glucose by
 1. Folin Wu
 2. O- Toludine methods

2. ELECTROPHORETIC TECHNIQUES

SDS - PAGE and Agarose Gel Elcctrophoresis.

3. EXPERIMENTS ON ENZYMES BY COLORIMETRY

- b. Effect of pH, temperature and substrate concentration for amylase and urease.
- c. Assay of activity of alkaline phosphatase in serum.
- d. Assay of serum Transaminases (SGOT, SGPT).

4 .CHROMATOGRAPHIC SEPARATIONS

- a. Paper chromatography separations and detection of amino acids and simple sugars.
- b. Chromatographic separations of chlorophyll carotenes of flower pigments and proteins using colulmn.
- c. Separation of polar and nonpolar Lipids by thin layer chromatography.

ELECTIVE PRACTICAL

BBC6.4P MEDICAL LABORATORY TECHNOLOGY

1. HAEMATOLOGY

Hematology, Hemoglobin shali's method, RBC count, PCV, ESR, Total and differential WBC count, Platelet count, Blood grouping, ABO system, Rh System Clotting time, Bleeding time

Serology – VDRL, CRP, RA, HIV, HBs Ag, Pregnancy test.

2. MICROBIOLOGY

Sterilization and disinfection, culture, gram staining, media preparation, antibiotic sensitivity testing

3. URINE AND FAECES ANALYSIS

1. Collection of urine and faecal samples
2. Faecal analysis to detect fats, undigested food and blood
3. Qualitative analysis of urine for normal and pathological conditions.

Books Recommended

1. Practical clinical Biochemistry - Harold varley, CBS, New delhi
2. Medical Laboratory Technology – Kanai L. Mukherjee, Tata McGraw Hill Publication and co. ltd., Vol, I, II, III
3. Clinical chemistry – Ranjana Chawla
4. laboratory Manual in Biochemistry – Jayaraman
5. Biochemical methods – S.Sadasivan And manickam
6. Introduction to practical biochemistry – David T. Plummer

ELECTIVE II

BBC6.5 MEDICAL LABORATORY TECHNOLOGY II

UNIT-I: Blood Banking

Blood grouping- ABO System, ABO Grouping, Rh typing,. Coomb's test,. Blood transfusion - Blood donors, donor screening, drawing of blood, compatibility testing, cross matching, blood transfusion complications.

UNIT-II: CSF and Other body fluids

Cerebrospinal fluid and the body fluids. Semen analysis, sputum examination, pregnancy test - Interpretation.

UNIT-III: Endocrine function test

Thyroid function test - thyroid hormones, function. Clinical disorder- diagnosis.T4, I131 Uptake, TSH, Stimulation test, FT4, FTI, TSH, TBG.

UNIT-IV: Medical Parasitology

Amoebiasis, malarial parasites – life cycle, pathogenesis of malaria – acute and chronic filariasis – diagnosis

UNIT-V Medical microbiology

Culturing of organisms from various specimens. Culture media and antibiotic sensitivity test (pus, urine, Stool, sputum, throat swab, gram staining, Zielh –Neilson staining (TB, Lpra bacilli). Safety procedure in microbiological techniques.

References:

1. Medical Laboratory Technology - L. Mukherjee. Vol. I, II, III. Tata Mcgraw - Hill Publishing Company Limited
2. Medical Laboratory Technology - V>H. Talib
3. Clinical Laboratory practices in CMC procedur, CMC, Vellore.
4. Medical lab technology - Ramnik Sood.

ELECTIVE III

BBC6.6 IMMUNOLOGY

UNIT-I

Innate and Acquired immunity, antibody and cell mediated immune response, primary and secondary lymphoid organs, structure of T, B and NK cell, structure and function of Neutrophils, Eosinophils and Basophiles, Macrophages – Phagocytosis and inflammation.

UNIT-II

Antigen - Properties specificity, cross reactivity, antigenecity, Immunogenecity, antigen determinants, Haptens, adjuvants, self-antigen [MHC]. Antibodies- properties, classes, sub classes of Immunoglobulins - structure, specificity and distribution. Antigen and antibody intraction, precipitation and agglutination, complement, cytokines.

UNIT-III

Allergy and Hypersensitivity – type – I, II, III and IV their clinical manifestation. Immune diseases – Rheumatoid arthritis - Myasthenia gravis. Immunity to bacteria & Virus.

UNIT-IV

Transplantation – Allograft rejection, graft Vs Host reaction, Immunosuppressor – mechanism of graft rejection. Outline of tumor cells and treatment.

UNIT-V

Precipitation in gel: Ouchterlony procedure, radial immuno duffision, Immuno electrophoresis, Electro immunoduffision, RIA and ELISA.

Books Recommended

1. Immunology - J. kannan, MJP Publishers, Chennai-5
2. Immunology - Riot Ivanna, Jonathan Brastoff, David Male, 1993.
3. Immunology - Janis Kuby, 4th edition, 2000.
4. Immunology - An introduction, Tizarrrd, r. Jan 1995.
5. Fundamendal of Immunology - Lippincot praven publications, 4th edition.
6. Essential and clinical Immunology - Halen chapel, Mansal Haney, Siraj misbah & Nial Snowdan.
7. Immunology - Geoffrey zubay, W.M.C, Brown publishers, 4th edition 1992.
8. Immunology - The immune system in health & disease, 3rd edition.

SKILLED BASED COURSE IV

BBC6.7 BIOSTATISTICS II

UNIT-I

Theoretical Distribution – Definition, Type of Theoretical Distribution, Binomial distribution and Poisson distribution- Definition, characteristics and Properties. Normal distribution, normal curve, standard Normal distribution - characteristics and Properties.

UNIT-II

Regression Analysis – Introduction, Definition, uses, types of regression- Positive and negative, linear and non-linear, simple and multiple, partial and total. Regression equation – Regression equation of X on Y and Y on X.

UNIT-III

F-test and it's application, testing of Hypothesis – Null hypothesis, alternative hypothesis, standard error.

UNIT-IV

Chi- Square test- Introduction, Characteristics of Chi- Square test, Assumption, degree of freedom, application of chi- square test, t-test – Application and its Uses.

UNIT-V

Analysis of Variance- Introduction, techniques of Analysis of variance (ANOVA) – One way and two way classification, steps involved in analysis.

Books for References:

1. Sundar Rao- Biostatistics.
2. Daniel – Biostatistics, John wiley & sons
3. Lewis, A. E (1971) – Biostatistics
4. Gupta S.P,(1997) Biostatistical Methods, S. Chand & Sons
5. Sundar Rao P.S.S, Jesudian.G& Richard.J [1987], An Introduction for Biostatistics [2nd edition] Prestographit, vellore, India
6. Biostatistics – P. Rama Krishna, Saras Publication [1995].
7. elhance D.N [1972], Fundamentals of statistics kitab mahal, allahabad.
8. Lewis, A.E [1971]- Bio-Statistics.
9. Daniel: Biostatistics, John Wiley 7 Sons.
10. Zar. J – BioStatistical analysis, prentice Hall of India.