BLDE
(DEEMED TO BE UNIVERSITY)

Choice Based Credit System (CBCS)

Curriculum

B.Sc. Programme in
Perfusion Technology
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
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BLDE(DU)/REG/B.Sc.-Bio-Sci/2020-21/ 1827/6 May 12, 2020

NOTIFICATION

Sub: Curriculum for B.Sc. Programme in Biomedical 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 Biomedical Sciences'** in 1) Medical Laboratory Technology (MLT), 2) Anaesthesia Technology, 3) Operation Theater Technology, 4) Respiratory Care Technology, 5) Cardiac Care Technology, 6) Perfusion Technology, 7) Emergency Medicine Technology, 8) Optometry, 9) Forensic Science, 10) Clinical Genetics, 11) Audiology & Speech-Language Pathology, 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 Allied Health Sciences,
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

Programme Outcome:

- To prepare competent entry-level Percussionist in the cognitive (knowledge), psychomotor (skills), and affective (behaviour) learning domains.
- To provide a base knowledge of perfusion theory, the skill to implement that knowledge and proficiency in its application in accordance with the needs of healthcare providers and employers.

Programme Specific Outcome:

At the completion of course, students will be able to:

- Demonstrate clinical skills in cardiopulmonary bypass and mechanical circulatory devices.
- Demonstrate clinical skills in auto transfusion, blood conservation, and blood product management.
- Demonstrate clinical skills in laboratory analysis of blood gases, hematocrit, and coagulation.
- Integrate perfusion theory to clinical applications.
- Demonstrate acquired knowledge of various perfusion equipment and supplies used in thehealthcare setting

SEMESTER -I												
Code No.	**Course Name**	**Credits/ Week**				**Hrs/semester**				**Marks**		
		Lecture (L)	**Tutorial (T)**	**Practical (P)**	**Total Credits (C)**	**Lecture (L)**	**Tutorial (T)**	**Practical (P)**	**Total hrs.**	**Internal Assessment**	**Semester Exam**	**Total**
Theory												
BPFT1.1	Human Anatomy Part I	3	-	-	3	45	-	-	45	20	80	100
BPFT1.2	Human Physiology Part I	3	-	-	3	45	-	-	45	20	80	100
BPFT1.3	General Biochemistry Nutrition	3	1	-	4	45	15	-	60	20	80	100
BPFT1.4	Introduction to National Health care System (Multidisciplinary/interdisciplinary)	3	-	-	3	45	-	-	45	20	80	100
Practical												
BPFT1.1 P	Human Anatomy Part I	-	-	4	-	-	-	60	60	-	-	-
BPFT1.2 P	Human Physiology Part I	-	-	4	-	-	-	60	60	-	-	-
BPFT1.3 P	General Biochemistry	-	-	4	-	-	-	60	60	-	-	-
BPFT1.5 P	Community Orientation & Clinical Visit (including related practical's to the parent course	-	-	8	-	-	-	120	120	-	-	-
Ability Enhancement Elective Course												
BPFT1.6	English & Communication skills	3	-	-	3	45	-	-	45	100	-	100
BPFT1.7	Environmental Sciences											
	Total	15	1	20	16	225	15	300	540	180	320	500

SEMESTER- II												
Code No.	**Course Name**	**Credits/ Week**				**Hrs/semester**				**Marks**		
		Lecture (L)	**Tutorial (T)**	**Practical (P)**	**Total Credits (C)**	**Lecture (L)**	**Tutorial (T)**	**Practical (P)**	**Total hrs.**	**Internal Assessment**	**Semester Exam**	**Total**
Theory												
BPFT2.1	Human Anatomy Part II	2	-	-	2	30	-	-	30	10	40	50
BPFT2.2	Human Physiology Part II	2	-	-	2	30	-	-	30	10	40	50
BPFT2.3	General Microbiology	3	-	-	3	45	-	-	45	20	80	100
BPFT2.4	Basic Pathology & Haematology	3	1	-	4	45	15	-	60	20	80	100
BPFT2.5	Introduction to Quality and Patient safety (Multidisciplinary/Interdisciplinary)	3	-	-	3	45	-	-	45	20	80	100
Practical												
BPFT2.1P	Human Anatomy Part II	-	-	4	-	-	-	60	60	-	-	-
BPFT2.2P	Human Physiology Part II	-	-	2	-	-	-	30	30	-	-	-
BPFT2.3P	General Microbiology	-	-	4	-	-	-	60	60	-	-	-
BPFT2.4P	Basic Pathology & Haematology	-	-	4	-	-	-	60	60	-	-	-
BPFT2.6P	Community Orientation & Clinical Visit (Including related practical's to the parent course)	-	-	8	-	-	-	120	120	-	-	-
Skill Enhancement Elective Course												
BPFT2.7	Medical Bioethics & IPR	3	-	-	3	45	-	-	45	100	-	100
BPFT2.8	Human Rights & Professional Values											
		16	1	22	17	240	15	330	585	180	320	500

SEMESTER- III

Code No.	Course Name	Credits/ Week					Hrs/semester					Marks		
		Lecture (L)	Tutorial (T)	Practical (P)	Clinical Posing/ Rotation	Total Credits (C)	Lecture (L)	Tutorial (T)	Practical (P)	Clinical Posing/ Rotation	Total hrs.	Internal Assessment	Semester Exam	Total
Theory														
BPFT3.1	Applied Pharmacology	3	1	-	-	4	45	15	-	-	60	20	80	100
BPFT3.2	Applied Anatomy and physiology of Cardiovascular system related to PT	3	1	-	-	4	45	15	-	-	60	20	80	100
BPFT3.3	Basics of Perfusion Technology	2	1	-	-	3	30	15	-	-	45	20	80	100
BPFT3.4	PT Directed Clinical Education-III	-	-	-	-	8	-	-	-	360	360	50	-	50
Practical														
BPFT3.2P	Applied Anatomy and Physiology of Cardiovascular system related to PT	-	-	4	-	2	-	-	60	-	60	10	40	50
BPFT3.3P	Basics od Perfusion technology	-	-	4	-	2	-	-	60	-	60	10	40	50
Generic Elective Course														
BPFT3.5	Pursuit of Inner Self Excellence (POIS)	3	-	-	-	3	45	-	-	-	45	100	-	100
BPFT3.6	Organisational Behaviour													
Total		11	3	8	24	26	165	45	120	360	690	230	320	550

SEMESTER -IV

Code No.	Course Name	Credits/ Week					Hrs/semester					Marks		
		Lecture (L)	Tutorial (T)	Practical (P)	Clinical Posing/ Rotation	Total Credits (C)	Lecture (L)	Tutorial (T)	Practical (P)	Clinical Posing/ Rotation	Total hrs.	Internal Assessment	Semester Exam	Total
Theory														
BPFT4.1	Applied Physiology and Biochemistry	2	1	-	-	3	30	15	-	-	30	20	80	100
BPFT4.2	Introduction of Perfusion Techniques	2	1	-	-	3	30	15	-	-	45	20	80	100
BPFT4.3CP	PT Directed Clinical Education-IV	-	-	-	30	10	-	-	-	450	450	50	-	50
Practical														
BPFT4.1P	Applied Physiology and Biochemistry	-	-	4	-	2	-	-	60	-	60	10	40	50
BPFT4.2P	Introduction of Perfusion Techniques	-	-	4	-	2	-	-	60	-	60	10	40	50
Ability Enhancement Elective Course														
BPFT4.4	Computer and Applications	3	-	-	-	3	45	-	-	-	45	100	-	100
BPFT4.5	Biostatistics and Research Methodology													
Total		7	2	8	30	23	105	30	120	450	225	210	240	450

SEMESTER- V

Code No.	Course Name	Credits/ Week					Hrs/semester					Marks		
		Lecture (L)	Tutorial (T)	Practical (P)	Clinical Posing/ Rotation	Total Credits (C)	Lecture (L)	Tutorial (T)	Practical (P)	Clinical Posing/ Rotation	Total hrs.	Internal Assessment	Semester Exam	Total
Theory														
BPFT5.1	Perfusion Technology:Cinical	3	1	-	-	4	45	15	-	-	60	20	80	100
BPFT5.2	Perfusion Technolgy:Applied	3	-	-	-	3	45	-	-	-	4	20	80	100
BPFT5.3CP	PT Directed Clinical Education-V	-	-	-	30	10	-	-	-	450	100	50	-	50
Practical														
BPFT5.1P	Perfusion Technology:Cinical	-	-	4	-	2	-	-	60	-	60	10	40	50
BPFT5.2P	Perfusion Technolgy:Applied	-	-	4	-	2	-	-	60	-	60	10	40	50
Core Elective Course														
BPFT5.4	Basic of Clinical Skill Learning	3	-	-	-	3	45	-	-	-	45	100	-	100
BPFT 5.5	Hospital Operation Management													
Total		9	1	8	30	24	135	15	120	450	265	210	240	450

SEMESTER -VI

Code No.	Course Name	Credits/ Week					Hrs/semester					Marks		
		Lecture (L)	Tutorial (T)	Practical (P)	Clinical Posing/ Rotation	Total Credits (C)	Lecture (L)	Tutorial (T)	Practical (P)	Clinical Posing/ Rotation	Total hrs.	Internal Assessment	Semester Exam	Total
Theory														
BPFT6.1	Perfusion technology:Advanced	3	1	-	-	4	45	15	-	-	60	20	80	100
BPFT6.2	Recent advances in Cardiopulmonary bypass & perfusion	2	1	-	-	3	30	15	-	-	45	20	80	100
BPFT6.3CP	PT Directed Clnical Education-VI	-	1	-	30	10	-	-	-	450	450	50	-	50
Practicals														
BPFT6.1P	Perfusion technology:Advanced	-	-	4	-	2	-	-	60	-	60	10	40	50
Total		5	2	4	30	19	75	30	60	450	165	100	200	300

INTERNSHIP										
Course Code	Course Name	Credits/Week				Hrs/semester				
		Lecture (L)	Tutorial (T)	Practical (P)	Clinical Posing/ Rotation	Lecture (L)	Tutorial (T)	Practical (P)	Clinical Posing/ Rotation	Total hrs.
BPFT 7.1	Internship	-	-	-	1440	-	-	-	1440	1440
Total		0	0	0	1440	0	0	0	1440	1440

Rules and Regulations of Curriculum

B.Sc. Perfusion Technology

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 for B.Sc. Perfusion Technology will be of 3 years + 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 1st semester	July – December
Odd Semester 3rd, 5thsemesters	June – October/ November
Even Semester 2nd, 4th, 6thsemesters	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 courses should be restricted to a maximum of 4 credits.
- All electives should be restricted to a maximum of 3 credits.
- All ability enhancement courses 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 Perfusion Program under CBCS Pattern

1. **Title of the Programme offered**: **BSc Perfusion Technology**

2. **Duration of the Programme:** Three years + 6 Months of 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 Perfusion**	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.

6.3 Evaluation for a course with clinical rotation or clinical training or internship will be done on a continuous basis.

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

7.1 Candidates having ≥ 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 presentation						

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, completed internship and submitted research project report to be eligible for award of Perfusion 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), clinical rotation and internship 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 are 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 Purfuion 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.,

$$SGPA\ (Si) = \sum(Ci \times Gi) / \sum Ci$$

Where Ci is the number of credits of the ith course and Gi is the grade point scored by the student in the ith 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.

$$CGPA = \sum(Ci \times Si) / \sum Ci$$

Where Si is the SGPA of the ith semester and Ci 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 Thus, SGPA = 139/20 = 6.95				

Semester 1	**Semester 2**	**Semester 3**	**Semester 4**
Credit : 20 SGPA : 6.9	Credit : 22 SGPA : 6.8	Credit : 25 SGPA : 6.6	Credit : 26 SGPA : 6.0
Semester 5	**Semester 6**		
Credit : 26 SGPA : 6.3	Credit : 25 SGPA : 8.0		
Illustration for CGPA			

Thus,

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

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.

a) Students admitted the program and absenting for more than 3 months must seek readmission into the appropriate semester as per university norms.
b) The student shall follow the syllabus in vogue (currently approved / is being followed) for the program.
c) 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 – Perfusion 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

Name of the Programme	**B.Sc. Perfusion Technology**
Name of the Course	**Human Anatomy- Part I**
Course Code	**BPFT1.1**

Teaching Objective	• To introduce the students to the concepts related to General anatomy, Muscular, Respiratory, Circulatory, Digestive and Excretory system
Learning Outcomes	• Comprehend the normal disposition, interrelationships, gross, functional and applied anatomy of various structures in the human body. • Demonstrate and understand the basic anatomy of Respiratory and Circulatory system • Demonstrate and understand the basic anatomy of Digestive and Excretory system

Sr.No.	Topics	No. of Hrs.
1	**Introduction to Anatomy, Terminology, Cell and Cell division, Tissues of body, Skin**	5
2	**Skeletal System** - Classification of bones, Parts of developing long bone and its blood supply, Joints I- Classification of joints, Joints II- Synovial Joint, Appendicular skeleton I- Bones of upper Limb, Appendicular skeleton II- Bones of lower limb, Axial skeleton-I , Axial skeleton-II	8
3	**Muscular System** - Muscle I-Types, Muscle II- Muscle groups and movements, Muscles of Upper limb, Muscles of lower limb, Muscles of Neck, Muscles of back , Muscles of abdomen	7
4	**Joints** – Shoulder, Hip, Knee, Movements and muscle groups producing movements at other joints	4
5	**Respiratory System** - Introduction to Respiratory system, Larynx, Thoracic cage and diaphragm, Lung & Pleura , Trachea &Bronchopulmonary segments , Mediastinum	6
6	**Circulatory System** - Types of blood vessels, Heart& Pericardium, Coronary Circulation, Overview of mediastinum , Blood vessels of Thorax	5
7	**Digestive System** - GIT I- Pharynx, Esophagus, GIT II-Stomach, GIT III- Small and Large Intestine, GIT IV-Liver &Gall Bladder, GIT V- Spleen, GIT VI-Pancreas , Salivary glands	7
8	**Excretory System** - Kidney, Ureter, Bladder, Urethra, Pelvis dynamic	3
Total		**45hrs**

BPFT1.1P - Human Anatomy Part I- (Demonstration)

Sr.No.	Topics	No of Hrs
1	**Introduction to Anatomy, Terminology, Cell and Cell division, Tissues of body, Skin**	60
2	**Skeletal System** - Classification of bones, Parts of developing long bone and its blood supply, JointsI- Classification of joints, Joints II- Synovial Joint, Appendicular skeleton I- Bones of upper Limb, Appendicular skeleton II- Bones of lower limb, Axial skeleton-I , Axial skeleton-II	
3	**Muscular System** - Muscle I-Types, Muscle II- Muscle groups and movements, Muscles of Upper limb, Muscles of lower limb, Muscles of Neck, Muscles of back , Muscles of abdomen	
4	**Joints** – Shoulder, Hip ,Knee , Movements and muscle groups producing , movements at other joints	
5	**Respiratory System** - Introduction to Respiratory system, Larynx, Thoracic cage and diaphragm, Lung & Pleura , Trachea &Bronchopulmonary segments , Mediastinum	
6	**Circulatory System** - Types of blood vessels, Heart& Pericardium, Coronary Circulation, Overview of mediastenum , Blood vessels of Thorax	
7	**Digestive System** - GIT I- Pharynx, Oesophagus, GIT II-Stomach, GIT III- Small and Large Intestine, GIT IV-Liver &Gall Bladder, GIT V- Spleen, GIT VI-Pancreas , Salivary glands	
8	**Excretory System** - Kidney, Ureter, Bladder, Urethra, Pelvis dynamic	
Total		**60 hrs**

TextBooks :

1. Manipal Manual of Anatomy for Allied Health Sciences courses:Madhyastha S.
2. G.J. Tortora& N.P Anagnostakos: Principles of Anatomy and Physiology
3. B.D. Chaurasia: Handbook of General Anatomy

Reference books:

1. B.D. Chaurasia : Volume I-Upper limb & Thorax,
   Volume II- Lower limb, Abdomen & Pelvis
   Volume III- Head, Neck, Face
   Volume IV- Brain-Neuroanatomy
2. Vishram Singh: Textbook of Anatomy Upper limb & Thorax
   Textbook of Anatomy Abdomen & Lower limb
   Textbook of Head neck and Brain
3. Peter L. Williams And Roger Warwick:- Gray's Anatomy - Descriptive and Applied, 36th Ed; Churchill Livingstone.
4. T.S. Ranganathan : Text book of Human Anatomy
5. Inderbirsingh, G P Pal : Human Embryology
6. Textbook of Histology, A practical guide:- J.P Gunasegaran

Name of the Programme	**B.Sc. Perfusion Technology**
Name of the Course	**Human Physiology Part I**
Course Code	**BPFT1.2**

Teaching objective	• To teach basic physiological concepts related to General physiology, Haematology, Nerve-Muscle physiology, Cardiovascular ,Digestive & Respiratory physiology
Learning outcomes	• To understand the basic physiological concepts of General physiology • To understand the basic physiological concepts of Hematology • To understand the basic physiological concepts of Nerve-Muscle physiology • To understand the basic physiological concepts of Respiratory physiology • To understand the basic physiological concepts of Cardiovascular physiology

Sr.No.	Topics	No. of Hrs.
1	**General Physiology-** Introduction to physiology, Homeostasis, Transport Across cell membrane	3
2	**Blood - Composition, properties and functions of Blood,** Hemopoiesis , Hemogram (RBC, WBC, Platelet count, Hb Concentrations), Blood Groups - ABO and RH grouping, Coagulations & Anticoagulants, Anemias: Causes, effects & treatment, Body Fluid: Compartments, Composition, Immunity – Lymphoid tissue	10
3	**Cardio vascular system -** Introduction, general organization, functions & importance of CVS , Structure of heart, properties of cardiac muscle, Junctional tissues of heart & their functions, Origin & spread of Cardiac Impulse, cardiac pacemaker, Cardiac cycle & E C G, Heart Rate & its regulation, Cardiac output, Blood Pressure definition & normal values, Physiological needs & variation, regulation of BP	10
4	**Digestive system -** General Introduction, organization, innervations & blood supply of Digestive system, Composition and functions of all Digestive juices, Movements of Digestive System (Intestine), Digestion & Absorption of Carbohydrate, Proteins & Fats	6
5	**Respiratory System -**Physiologic anatomy, functions of respiratory system, non respiratory functions of lung, Mechanism of respiration, Lung Volumes & capacities, Transport of Respiratory GasesO_2, Transport of Respiratory Gases CO_2, Regulation of Respiration.	10
6	**Muscle nerve physiology -** Structure of neuron & types, Structure of skeletal Muscle, sarcomere, Neuromuscular junction& Transmission. Excitation & contraction coupling (Mechanism of muscle contraction)	6
Total		**45 hrs**

BPFT1.2P - Human Physiology Part I (Demonstration)

Sr. No.	Topics	No. of Hrs.
1	Study of Microscope and its use, Collection of Blood and study of Haemocytometer	60
2	Haemoglobinometry	
3	White Blood Cell count	
4	Red Blood Cell count	
5	Determination of Blood Groups	
6	Leishman's staining and Differential WBC Count	
7	Determination of Bleeding Time, Determination of Clotting Time	
8	Pulse & Blood Pressure Recording, Auscultation for Heart Sounds	
9	Artificial Respiration –Demonstration, Spirometry-Demonstration	
Total		**60hrs**

Textbooks

1. Basics of medical Physiology –D Venkatesh and H.H Sudhakar, 3rd edition.
2. Principles of Physiology – DevasisPramanik, 5th edition.
3. Human Physiology for BDS –Dr A.K. Jain, 5th edition.
4. Textbook of human Physiology for dental students-Indukhurana 2nd edition.
5. Essentials of medical Physiology for dental students –Sembulingum.

Reference books

1. Textbook of Medical Physiology, Guyton , 2nd South Asia Edition.
2. Textbook of Physiology Volume I & II (for MBBS) – Dr. A. K. Jain.
3. Comprehensive textbook of Medical Physiology Volume I & II – Dr. G. K. Pal.

Name of the Programme	**B.Sc. Perfusion Technology**
Name of the Course	**General Biochemistry & Nutrition**
Course Code	**BPFT1.3**

Teaching Objective	At the end of the course, the student demonstrates his knowledge and understanding on: • Structure, function and interrelationship of biomolecules and consequences of deviation from normal. • Integration of the various aspects of metabolism, and their regulatory pathways. • Principles of various conventional and specialized laboratory investigations and instrumentation, analysis and interpretation of a given data. • to diagnose various nutritional deficiencies • Identify condition and plan for diet • Provide health education base on the client deficiencies
Learning Outcomes	• Define "biochemistry." • Identify the five classes of polymeric biomolecules and their monomeric building blocks. • Explain the specificity of enzymes (biochemical catalysts), and the chemistry involved in enzyme action. • Explain how the metabolism of glucose leads ultimately to the generation of large quantities of ATP. • Describe how fats and amino acids are metabolized, and explain how they can be used for fuel. • Describe the structure of DNA, and explain how it carries genetic information in its base sequence. • Describe DNA replication. • Describe RNA and protein synthesis. • Explain how protein synthesis can be controlled at the level of transcription and translation. • Summarize what is currently known about the biochemical basis of cancer.

Sr. No.	Topics	No. of Hrs.
1	Introduction and scope of biochemistry	1
2	**Chemistry of carbohydrates, proteins, lipids and nucleic acid–** **Chemistry of Carbohydrates**: Definition, Functions, Properties, Outline of classification with eg.(Definition of Monosaccharides, Disaccharides, Polysaccharides and their examples). **Chemistry of Proteins:** Amino acids (total number of amino acids, essential and non essential amino acids) .Definition, Classification of Proteins Structural organization of protein, Denaturation of Proteins. **Chemistry of Lipids:** Definition, functions, Classification (Simple Lipids, Compound Lipids, Derived Lipids.) Essential Fatty Acids. **Chemistry of Nucleic acid**: Nucleosides and Nucleotides, Watson and Crick model of DNA, **RNA**- it's type along with functions	12
3	**Elementary knowledge of enzymes -** Classification, mechanism of enzyme action, Factors affecting activity of enzymes, enzyme specificity, Enzyme inhibition, Isoenzymes and their diagnostic importance.	8
4	**Biological oxidation** - Brief concept of biological oxidation: Definition of Oxidative phosphorylation Electron transport chain. Inhibitors and Uncouplers briefly	5
5	**Metabolism of Carbohydrate**:Glycolysis, TCA cycle, Definition and significance of glycogenesis and glycogenolysis. Definition and significance of HMP shunt, definition and significance of gluconeogenesis. Regulation of blood Glucose level, Diabetes Mellitus, Glycosuria.Glucose Tolerance Test. **Metabolism of Proteins**: Transamination, Transmethylation reactions. Urea cycle, Functions of glycine, tyrosine, phenylalanine, tryptophan and Sulphur containing aminoacids. **Metabolism of Lipid:**Outline of beta oxidation with energetic, Ketone bodies (Enumerate) and its importance. Functions of cholesterol and its biomedical significance. Lipid profile and its diagnostic importance. Fatty liver, lipotropic factor, atherosclerosis. **Metabolism of Nucleic acid**: Purine catabolism (Formation of uric acid), Gout	14
6	**Vitamins and Minerals-** RDA, Sources, functions and deficiency manifestations of Fat soluble vitamins. RDA, sources, functions and deficiency manifestations of Water soluble vitamins. RDA, Sources, functions and deficiency manifestations of Calcium, Phosphorous, Iron, Iodine	5
7	**Principle and applications of :**Colorimeters, pH Meter	5
8	**Pre examination Skills -** Collection and preservation of samples (Anticoagulants), transportation & separation of biological specimens, Sample rejection criteria, Disposal of biological Waste materials.	5
9	**Nutrition:** History of Nutrition, Nutrition as a science, Food groups, RDA, Balanced diet, diet planning, Assessment of nutritional status, **Energy:** Units of energy, Measurements of energy and value of food, Energy expenditure, Total energy/calorie requirement for different age groups and diseases, Satiety value, Energy imbalance- obesity, starvation, Limitations of the daily food guide, Role of essential nutrients in the balanced diet	5
Total		**60hrs**

BPFT1.3P – General Biochemistry (Demonstration)

Sr. No.	Topics	No. of Hrs
1	Introduction to Personnel protective equipments used in laboratory and their importance (LCD)	60
2	Handling of colorimeters – operation and maintenance (LCD)	
3	Serum electrolytes measurement (only demo)	
4	Demonstration of semi automated / fully automated blood analyser	
5	Demonstration of tests for carbohydrates (Monosacchrides, disaccharides and polysaccharides)	
6	Precipitation Reactions of protein (only demonstration)	
7	Test on bile salts (only demonstration)	
8	Tests on Normal constituents of Urin (only demo)	
9	Tests on Abnormal constituents of Urin (only demo)	
Total		**60 hrs**

Textbooks:

1. Textbook of Medical Laboratory Technology, Volume 1, 3rd Edition by PrafulGhodkar
2. Textbook of Medical Laboratory Technology, Volume 2, 3rd Edition by PrafulGhodkar
3. Medical Laboratory Technology (Volume 1): Procedure Manual for Routine Diagnostic, Kanai Mukharjee
4. Medical Laboratory Technology (Volume 2): Procedure Manualfor Routine Diagnostic, Kanai Mukharjee
5. Medical Laboratory Technology (Volume 3): Procedure Manual for Routine Diagnostic, Kanai Mukharjee
6. Essentials of Biochemistry, Second Edition, Dr.(Prof) Satyanarayana
7. Essentials of Biochemistry, 2nd Edition, Dr. PankajaNaik
8. Principles and Techniques of Biochemistry and Molecular Biology, 5Th Edition, Wilson &Walker

Reference books:

1. An Introduction to Chemistry, 8th Edition by Mark Bishop
2. Clinical Chemistry made easy, 1stEidtion by Hughes
3. Tietz Fundamentals of Clinical Chemistry , 7th Edition by Carl Burtis

Name of the Programme	**B.Sc. Perfusion Technology**
Name of the Course	**Introduction to National Health Care System (Multidisciplinary/Interdisciplinary)**
Course Code	**BPFT1.4**

Teaching Objective	• To teach the measures of the health services and high-quality health care • To understand whether the health care delivery system is providing high-quality health care and whether quality is changing over time. • To provide to National Health Programme- Background objectives, action plan, targets, operations,in various National Heath Programme. • To introduce the AYUSH System of medicines.
Learning Outcomes	• The course provides the students a basic insight into the main features of Indian health care delivery system and how it compares with the other systems of the world.

Sr. No.	Topics	No. of Hrs.
1	**Introduction to healthcare delivery system** - Healthcare delivery system in India at primary, secondary and tertiary car; Community participation in healthcare delivery system; Health system in developed countries; Private / Govt Sector; National Health Mission; National Health Policy; Issues in Health Care Delivery System in India	10
2	**National Health Programme-** Background objectives, action plan, targets, operations, achievements and constraints in various National Heath Programme.	8
3	**Introduction to AYUSH system of medicine -** Introduction to Ayurveda; Yoga and Naturopathy; Unani; Siddha; Homeopathy; Need for integration of various system of medicine	8
4	**Health scenario of India-** past, present and future	4
5	**Demography & Vital Statistics-** Demography – its concept; Census & its impact on health policy	5
6	**Epidemiology** - Principles of Epidemiology; Natural History of disease; Methods of Epidemiological studies; Epidemiology of communicable & non-communicable diseases, disease, transmission, host defense immunizing agents, cold chain, immunization, disease, monitoring and surveillance.	10
Total		**45 hrs**

Books:

1. National Health Programs Of India National Policies and Legislations Related to Health: 1 J. Kishore (Author)
2. A Dictionary of Public Health Paperback by J Kishor
3. Health System in India: Crisis & Alternatives , National Coordination Committee, Jan SwasthyaAbhiyan
4. In search In Search of the Perfect Health System
5. Central Bureau of Health Intelligence (1998). Health Information of India, Ministry of Health and Family Welfare, New Delhi.
6. Goyal R. C. (1993). Handbook of Hospital Personal Management, Prentice Hall of India, New Delhi, 17–41. Ministry of Health and Family Welfare (1984). National Health Policy, Annual Report (1983–4), Government of India, New Delhi
7. Historical Development of Health Care in India, Dr. Syed Amin Tabish,
8. cultural Competence in Health Care by Wen-Shing Tseng (Author), Jon Streltzer (Author)
9. Do We Care: India's Health System by K. Sujatha Rao (Author)

BPFT105P - Community Orientation & Clinical Visit (including related practical's to the parent course) (Total - 120 hrs.)

ABILITY ENHANCEMENT ELECTIVE COURSE

Name of the Programme	**B.Sc. Perfusion Technology**
Name of the Course	**English and Communication Skills**
Course Code	**BPFT1.6**

Teaching Objective	• This course deals with essential functional English aspects of the of communication skills essential for the health care professionals. • To train the students in oral presentations, expository writing, logical organization and Structural support.
Learning Outcomes	• Able to express better. • Grow personally and professionally and Developconfidence in every field

Sr. No.	Topics	No. of Hrs.
1	**Basics of Grammar** - Vocabulary, Synonyms, Antonyms, Prefix and Suffix, Homonyms, Analogies and Portmanteau words	6
2	**Basics of Grammar – Part II** - Active, Passive, Direct and Indirect speech, Prepositions, Conjunctions and Euphemisms	6
3	**Writing Skills** - Letter Writing, Email, Essay, Articles, Memos, one word substitutes, note making and Comprehension	3
4	Writing and Reading, Summary writing, Creative writing, news paper reading	3
5	Practical Exercise, Formal speech, Phonetics, semantics and pronunciation	5
6	**Introduction** to communication skills - Communication process, Elements of communication, Barriers of communication and how to overcome them, Nuances for communicating with patients and their attenders in hospitals	6
7	**Speaking** - Importance of speaking efficiently, Voice culture, Preparation of speech. Secrets of good delivery, Audience psychology, handling , Presentation skills, Individual feedback for each student, Conference/Interview technique	4
8	**Listening** - Importance of listening , Self assessment, Action plan execution, Barriers in listening, Good and persuasive listening	4
9	**Reading** - What is efficient and fast reading , Awareness of existing reading habits, Tested techniques for improving speed, Improving concentration and comprehension through systematic study	4
10	**Non Verbal Communication** - Basics of non-verbal communication, Rapport building skills using neuro- linguistic programming (NLP), Communication in Optometry practice	4
Total		**45 hrs**

Text books:

1. Graham Lock, Functional English Grammar: Introduction to second Language Teachers.Cambridge University Press, New York, 1996.
2. Gwen Van Servellen. Communication for Health care professionals: Concepts,practice and evidence, Jones & Bartlett Publications, USA, 2009

Name of the Programme	B.Sc. Perfusion Technology
Name of the Course	Environmental Sciences
Course Code	BPFT1.7

Teaching Objective	• To understand and define terminology commonly used in environmental science • To teach students to list common and adverse human impacts on biotic communities, soil, water, and air Quality. • To understand the processes that govern the interactions of organisms with the biotic and abiotic. • Understand the relationship between people and the environment; Differentiate between key ecological terms and concepts
Learning Outcomes	• Current environmental issues and highlight the importance of adopting an interdisciplinary approach. • Sample an ecosystem to determine population density and distribution. • Create food webs and analyse possible disruption of feeding relationships.

Sr. No.	Topics	No. of Hrs.
1	**Components of Environment** – Hydrosphere, lithosphere, atmosphere and biosphere – definitions with examples; Interaction of man and environment;	4
2	**Ecosystem** : Basic concepts, components of ecosystem, Tropic levels, food chains and food webs, Ecological pyramids, ecosystem functions, Energy flow in ecological systems, Characteristics of terrestrial fresh water and marine ecosystems,	5
3	**Global Environmental Problems** – Green House Effect, Acid rain, El Nino, Ozone depletion, deforestation, desertification, salination, biodiversity loss; chemical and radiation hazards.	4
4	**Environmental pollution and degradation** – Pollution of air, water and land with reference to their causes, nature of pollutions, impact and control strategies; perspectives of pollution in urban, industrial and rural areas. Habitat Pollution by Chlorinated Hydrocarbons (DDT, PCBs, Dioxin etc, Endocrine disrupting chemicals, Nutrient pollution.	8
5	**Environmental Management** – Concept of health and sanitation, environmental diseases – infectious (water and air borne) and pollution related, spread and control of these diseases, health hazards due to pesticide and metal pollution, waste treatment, solid waste management, environmental standards and quality monitoring.	6
6	**Environmental Protection Act** – Environmental Laws, national movements, environmental ethics – holistic approach of environmental protection and conservation, IUCN – role in environmental protection. Concept with reference to UN – declaration, aim and objectives of human right policies with reference to India, recent north-south debate on the priorities of implementation, Environmental Protection Agency (EPA)	10
7	**Bioremediation** – Oil spills, Wastewater treatment, chemical degradation, heavy Metals.	8
Total		**45 hrs**

Books:

1. Carson, R. 2002. Silent Spring. Houghton Mifflin Harcourt.
2. Gadgil, M., &Guha, R. 1993. This Fissured Land: An Ecological History of India. Univ. of California Press.
3. Gleeson, B. and Low, N. (eds.) 1999. Global Ethics and Environment, London, Routledge.
4. Gleick, P. H. 1993. Water in Crisis. Pacific Institute for Studies in Dev., Environment & Security. Stockholm Env. Institute, Oxford Univ. Press.
5. Groom, Martha J., Gary K. Meffe, and Carl Ronald Carroll. Principles of Conservation Biology. Sunderland: Sinauer Associates, 2006.
6. Grumbine, R. Edward, and Pandit, M.K. 2013. Threats from India's Himalaya dams. Science, 339: 36-37.
7. McCully, P. 1996. Rivers no more: the environmental effects of dams (pp. 29-64). Zed Books.
8. McNeill, John R. 2000. Something New Under the Sun: An Environmental History of the Twentieth Century.
9. Odum, E.P., Odum, H.T. & Andrews, J. 1971. Fundamentals of Ecology. Philadelphia: Saunders.
10. Pepper, I.L., Gerba, C.P. &Brusseau, M.L. 2011. Environmental and Pollution Science. Academic Press.
11. Rao, M.N. &Datta, A.K. 1987. Waste Water Treatment. Oxford and IBH Publishing Co. Pvt. Ltd.
12. Raven, P.H., Hassenzahl, D.M. & Berg, L.R. 2012. Environment. 8th edition. John Wiley & Sons.
13. Rosencranz, A., Divan, S., & Noble, M. L. 2001. Environmental law and policy in India. Tripathi 1992.
14. Sengupta, R. 2003. Ecology and economics: An approach to sustainable development. OUP.
15. Singh, J.S., Singh, S.P. and Gupta, S.R. 2014. Ecology, Environmental Science and Conservation. S. Chand Publishing, New Delhi.
16. Sodhi, N.S., Gibson, L. & Raven, P.H. (eds). 2013. Conservation Biology: Voices from the Tropics. John Wiley & Sons.
17. Thapar, V. 1998. Land of the Tiger: A Natural History of the Indian Subcontinent.
18. Warren, C. E. 1971. Biology and Water Pollution Control. WB Saunders.
19. Wilson, E. O. 2006. The Creation: An appeal to save life on earth. New York: Norton.
20. World Commission on Environment and Development. 1987. Our Common Future. Oxford University Press

SEMESTER- II

Name of the Programme	**B.Sc. Perfusion Technology**
Name of the Course	**Human Anatomy- Part II**
Course Code	**BPFT2.1**

Teaching Objective	• To teach the students the basic anatomy of Reproductive , Lymphatic Endocrine ,Nervous system and Special senses
Learning Outcomes	• Demonstrate and understand the basic anatomy of Reproductive and Lymphatic system. • Demonstrate and understand the basic anatomy of Endocrine ,Nervous system • Demonstrate and understand the basic anatomy of Special senses

Sr. No.	Topics	No. of Hrs.
1	**Reproductive system -** Male- Testis, Spermatic Cord, Female- Ovaries & Fallopian tube, Uterus	6
2	**Lymphatic system -** Lymphoid Organs, Lymph node groups- Cervical, Axillary, Inguinal	5
3	**Endocrine system -** Thyroid, Parathyroid, Adrenal, Pitutary	4
4	**Nervous system -** Introduction to nervous system(Neuron, ANS, PNS) Meninges, Cerebrum I, Cerebrum II, Cerebellum, Blood supply of Brain, Brain stem, Spinal cord, Cranial and peripheral nerves, CSF & Ventricles	12
5	**Sensory system -** Eye (Gross anatomy), Ear	3
Total		**30hrs**

BPFT2.1P - Human Anatomy Part II (Demonstration)

Sr. No.	Topics	No. of Hrs.
1	**Reproductive system -** Male- Testis, Spermatic Cord, Female- Ovaries & Fallopian tube, Uterus	60
2	**Lymphatic system -** Lymphoid Organs, Lymph node groups- Cervical, Axillary, Inguinal	
3	**Endocrine system -** Thyroid, Parathyroid, Adrenal, Pitutary	
4	**Nervous system -** Introduction to nervous system(Neuron, ANS, PNS) Meninges, Cerebrum I, Cerebrum II, Cerebellum, Blood supply of Brain ,Brain stem, Spinal cord, Cranial and peripheral nerves, CSF & Ventricles	
5	**Sensory system -** Eye (Gross anatomy), Ear	
Total		**60 hrs**

Textbooks:

1. Manipal Manual of Anatomy for Allied Health Sciences courses:Madhyastha S.
2. G.J. Tortora& N.P Anagnostakos: Principles of Anatomy and Physiology
3. B.D. Chaurasia: Handbook of General Anatomy

Reference books:

1. B.D. Chaurasia : Volume I-Upper limb & Thorax,
   Volume II- Lower limb, Abdomen & Pelvis
   Volume III- Head, Neck, Face
   Volume IV- Brain-Neuroanatomy
2. Vishram Singh: Textbook of Anatomy Upper limb & Thorax
   Textbook of Anatomy Abdomen & Lower limb
   Textbook of Head neck and Brain
3. Peter L. Williams And Roger Warwick:- Gray's Anatomy - Descriptive and Applied, 36th Ed; Churchill Livingstone.
4. T.S. Ranganathan : Text book of Human Anatomy
5. Inderbirsingh, G P Pal : Human Embryology
6. Textbook of Histology, A practical guide:- J.P Gunasegaran

Name of the Programme	B.Sc. Perfusion Technology
Name of the Course	Human Physiology Part II
Course Code	BPFT2.2

Teaching Objective	• To teach basic physiological concepts related to Renal physiology, Endocrinology& Reproductive physiology, CNS, Special senses
Learning Outcomes	• To understand the basic physiological concepts of Renal physiology • To understand the basic physiological concepts of Endocrinology& Reproductive physiology • To understand the basic physiological concepts of CNS, Special senses,

Sr. No.	Topics	No. of Hrs.
1	**Nervous system** -Functions of Nervous system , Neuron – Conduction of Impulses, factors affecting, Synapse- transmission, Receptors, Reflexes Ascending tracts, Descending tracts, Functions of various parts of the Brain.Cerebro-Spinal Fluid (CSF): Composition, functions & Circulation, Lumbar Puncture, Autonomic Nervous System (ANS): Functions.	10
2	**Special senses**- Vision: Structure of Eye, functions of different parts, Refractive errors of Eye and correction, Visual Pathway, Colour vision & tests for colour Blindness, Hearing: Structure and function of ear, Mechanism of Hearing, Tests for Hearing (Deafness)	6
3	**Skin -** Structure and function, Body temperature,Regulation of Temperature & fever.	4
4	**Endocrine System -** Short description of various endocrine glands and their functions	2
5	**Reproductive systems -** Structure & Functions of Reproductive system, Male Reproductive System: spermatogenesis, Testosterone, Female reproductive system: Ovulation, Menstrual cycle, Oogenesis, Tests for Ovulation, Oestrogen&Progesterone , Pregnancy test, Parturition. Contraceptives, Lactation: Composition of Milk, advantages of breast Feeding.	4
6	**Excretory System** General Introduction, structure & functions of kidney, Renal circulation, Glomerular filtration & tubular reabsorption, Nephron, Juxta Glomerular Apparatus,Mechanism of Urine formation, Micturition, Cystomatrogram.Diuretics, Artificial Kidney.	4
Total		**30hrs**

BPFT2.2P - Human Physiology Part II – (Demonstration)

Sr. No.	Topics	No. of Hrs.
1	Recording of body temperature	30
2	Examination of sensory system	
3	Examination of motor system	
4	Examination of Eye	
5	Examination of ear	
Total		**30 hrs**

Textbooks:

1. Basics of medical Physiology –D Venkatesh and H.H Sudhakar, 3rd edition.
2. Principles of Physiology – DevasisPramanik, 5th edition.
3. Human Physiology for BDS –Dr A.K. Jain, 5th edition.
4. Textbook of human Physiology for dental students-Indukhurana 2nd edition.
5. Essentials of medical Physiology for dental students –Sembulingum.

Reference books:

1. Textbook of Medical Physiology, Guyton , 2nd South Asia Edition.
2. Textbook of Physiology Volume I & II (for MBBS) – Dr. A. K. Jain.
3. Comprehensive textbook of Medical Physiology Volume I & II – Dr. G. K. Pal.

Name of the Programme	**B.Sc. Perfusion Technology**
Name of the Course	**General Microbiology**
Course Code	**BPFT2.3**

Teaching Objective	• To introduce basic principles and then applies clinical relevance in four segments of the academic preparation for paramedical: immunology, bacteriology, mycology, and virology. This rigorous course includes many etiological agents responsible for global infectious diseases.
Learning Outcomes	• Upon completion, students should be able to demonstrate knowledge of microorganisms and the disease process as well as aseptic and sterile techniques. • Perform microbiological laboratory procedures according to appropriate safety standards

Sr. No.	Topics	No. of Hrs.
1	**Concepts and Principles of Microbiology -** Historical Perspective, Koch's Postulates, Importance of Microbiology, Microscopy, Classification of Microbes.	4
2	**General Characters of Microbes -** Morphology, staining methods, Bacterial growth & nutrition, Culture media and culture methods +ABS, Collection of specimen, transport and processing, Antimicrobial mechanism and action, Drug Resistance minimization.	6
3	**Sterilization and Disinfection -** Concept of sterilization, Disinfection asepsis,Physical methods of Sterilization, Chemical methods (Disinfection), OT Sterlization, Biological waste and Biosafety & Biohazard.	5
4	**Infection and Infection Control -** Infection, Sources, portal of entry and exit, Standard (Universal) safety Precautions & hand hygiene, Hospital acquired infections & Hospital Infection Control	3
5	**Immunity -** Types Classification, Antigen, Antibody – Definition and types, Ag-Ab reactions – Types and examples, Procedure of Investigation & Confidentiality, Immunoprophylaris – Types of vaccines, cold chain, Immunization Schedule.	6
6	**Systemic Bacteriology (Morphology, diseases caused, specimen collection & lists of laboratory tests) –** Introduction, Gram Positive Cocci & Gram Negative Cocci, Enterobacteraecea& Gram negative bacilli, Mycobacteria, Anaerobic bacteria &Spirochaetes, Zoonotic diseases, Common Bacterial infections of eye.	7
7	**Mycology -** Introduction, Classification, outline of lab diagnosis, List of Fungi causing:Common fungal infections of eyes, Superficial Mycoses, Deep mycoses & opportunistic , Fungi.	3
8	**Virology -** Common Viral infection of eye, Introduction, General Properties, outline of lab diagnosis& Classification, HIV Virus, Hepatitis -B Virus.	4
9	**Parasitology** – Morphology, Life Cycle & Outline of Lab Diagnosis & Classification, Common parasite infection of eye, Protozoa- E, histolytica,Malarial Parasite, General properties, classification, list of diseases caused by:Cestodes and Trematodes, Intestinal Nematodes& Tissue Nematodes, Vectors.	7
Total		**45 hrs**

BPFT2.3P - General Microbiology (Demonstration)

Sr. No.	Topics	No. of Hrs.
1	Concepts and Principles of Microbiology	60
2	General Characters of Microbes	
3	Sterilization and Disinfection	
4	Infection and Infection Control	
5	Immunity	
6	Systemic Bacteriology (Morphology, diseases caused, specimen collection & lists of laboratory test)	
7	Mycology	
8	Virology	
9	Parasitology	
Total		**60 hrs**

Text Book:

1. Text Book of Microbiology for Nursing Students, AnantNarayanPanikar
2. Text Book of Ophthalmology, Khurana

Reference Book:

1. Text Book of Microbiology, Baveja.

Name of the Programme	**B.Sc. Perfusion Technology**
Name of the Course	**Basic Pathology & Hematology**
Course Code	**BPFT2.4**

Teaching Objective	• Understand the importance of clinical information in supporting a timely, accurate pathological diagnosis. • Describe normal and disordered hematopoiesis • Develop implement and monitor a personal continuing education strategy and critically appraise sources of pathology related medical information. • Describe mechanisms of oncogenesis&demonstrate an understanding of genetics and cytogenetics pertaining to hematology
Learning Outcomes	• The student should submit the appropriate tissue sections per protocol to demonstrate the lesion and other clinically-relevant information needed for the final pathologic report • To aid hematology in the reference ranges for hemoglobin, hematocrit, erythrocytes, and leukocytes in infants, children and adult.

Sr. No.	Topics	No. of Hrs.
1	Introduction to Pathology	1
2	Working and maintenance of instruments	2
3	General principles of Haematologytechniques, blood collection, anticoagulants, fixation, processing, routine staining, Haemoglobin, TLC, DLC, Peripheral smear (CBC report), platelet counts, cell counter working	10
4	Generalprinciplesof Histopathologytechniques collection, fixation, processing & routine staining	3
5	General principles of Cytopathology techniques collection, fixation, processing & routine staining	5
6	General principles of Clinical Pathology techniques samplecollection, processingforroutine test, normal urine & urine examination, urine strip, introductions to body fluids (Distinguish between Transudate and exudate)	10
7	Generalprinciplesof Blood Bank techniques antigen, antibody, ABO & Rh system	5
8	General principles of Autopsy & Museum	4
9	**GeneralPathologyincludingintroductionto :** I) Cell Injury (Reversible, Irreversible cell injury) II) Inflammation(Acute inflammation, cells, Chronic inflammation, granuloma and examples III) Circulatorydisturbances(Thrombosis, Embolism ,Edema- ascetic, pleural, pericardial-effusions, Shock, Allergy, Anaphylaxis-Definition, Morphological features, And distinguishing features) IV) Neoplasia (Definition of Anaplasia, dysplasia, metaplasia and metastasis and difference between benign and malignant lesions)	8

10	**Systemicpathologybasis andmorphologyof common disorders like** I) Anemia(types-Iron deficiency, megaloblastic, Aplastic-Etiology, Pathogenesis Investigation)- II) Leukemia (Acute and chronic, Peripheral smear), AIDS(Definition, Pathogenesis, Mode of transmission, Two Confirmatory test Tridot, Western blot), Hepatitis (Types, Etiology, Mode of spread) III) Malaria-(Mode of spread IV) Tuberculosis-(Primary and secondary tb, Granuloma formation, Mode of transmission, Organs involved	8
11	Maintenance and medicolegal importance of records and specimens, Lab information system(LIMS)	3
12	Biomedical Waste, Universal Safety Precaution(Protocol to be followed after -Needle injury, chemical injury	1
Total		**60hrs**

BPFT2.4P – Basic Pathology & Hematology (Demonstration)

Sr. No.	Topics	No. of Hrs.
1	Working and maintenance of instruments,	60
2	General principles of Haematologytechniques, blood collection, anticoagulants, fixation, processing, routine staining, Haemoglobin, TLC, DLC, Peripheral smear (CBC report), platelet counts, cell counter working	
3	Generalprinciplesof Histopathologytechniques collection, fixation, processing & routine staining	
4	General principles of Cytopathology techniques collection, fixation, processing & routine staining	
5	General principles of Clinical Pathology techniques samplecollection, processingforroutinetest, normal urine & urine examination, urine strip, introductions to body fluids (Distinguish between Transudate and exudate)	
6	GeneralprinciplesofBloodBanktechniquesantigen, antibody, ABO & Rh system	
7	General principles of Autopsy & Museum	
Total		**60hrs**

Reference Books:

1. A *Handbook of Medical* Laboratory (Lab) Technology: *Editor*) *Second Edition*. *V.H. Talib* (Ed.).
2. Comprehensive Textbook Of Pathology For Nursing: Pathology Clinical Pathology Genetics. Ak Mandal Shramana Choudhury, Published by Avichal Publishing Compnay | Language English
3. Textbook of Medical Laboratory Technology- PrafulB. Godkar, Darshan P. Godkar
4. Medical Laboratory Technology. Methods and Interpretations – RamnikSood (volume 1&2)
5. Medical Laboratory technology a procedure manual for routine diagnostic test – vol – I, II, III. Kanai L. Mukharjee Tata Mc graw hill pub. New Delhi.
6. Practical Pathology P. Chakraborty Gargi Chakraborty New Central Book Agency, Kolkata.
7. Theory & Practice of Histological Techniques John D. Bancroft et.al. Churchill Livingstone Printed in China.
8. Histochemistry in Pathology M.I. Filipe et.al. Churchill Livingstone, London
9. Hand Book of Histopathological & Histochemical Techniques C.F.A. Culling Butterworths Company Ltd. London.
10. A Handbook of Medical Laboratory (Lab) Technology. By V.H Talib.

Name of the Programme	**B.Sc. Perfusion Technology**
Name of the Course	**Introduction to Quality and Patient safety**
Course Code	**BPFT2.5**

Teaching Objective	• The objective of the course is to help students understand the basic concepts of quality in health Care and develop skills to implement sustainable quality assurance program in the health system. • To understand the basics of emergency care and life support skills. • To Manage an emergency including moving a patient • To help prevent harm to workers, property, the environment and the general public. • To provide a broad understanding of the core Course areas of infection prevention and control. • To provide knowledge on the principles of on-site disaster management
Learning Outcomes	• Upon completion, Students should be able to apply healthcare quality improvement and patient safety principles, concepts, and methods at the micro-, meso-, and macro-system levels.

Sr. No.	Topics	No. of Hrs.
1	**Quality assurance and management** – Concepts of Quality of Care, Quality Improvement Approaches, Standards and Norms, Introduction to NABH guidelines	7
2	**Basics of emergency care and life support skills** - Basic life support (BLS), Vital signs and primary assessment, Basic emergency care – first aid and triage, Ventilations including use of bag-valve-masks (BVMs), Choking, rescue breathing methods, One- and Two-rescuer CPR	7
3	**Bio medical waste management and environment safety** -Definition of Biomedical Waste, Waste minimization, BMW – Segregation, collection, transportation, treatment and disposal (including color coding), Liquid BMW, Radioactive waste, Metals / Chemicals / Drug waste, BMW Management & methods of disinfection, Modern technology for handling BMW, Use of Personal protective equipment (PPE), Monitoring & controlling of cross infection (Protective devices)	8
4	**Infection prevention and control** - Evidence-based infection control principles and practices [such as sterilization, disinfection, effective hand hygiene and use of Personal protective equipment (PPE)],Prevention & control of common healthcare associated infections, Components of an effective infection control program, Guidelines (NABH and JCI) for Hospital Infection Control	8
5	**Antibiotic Resistance** - History of Antibiotics, How Resistance Happens and Spreads, Types of resistance- Intrinsic, Acquired, Passive, Trends in Drug Resistance, Actions to Fight Resistance, Bacterial persistence, Antibiotic sensitivity, Consequences of antibiotic resistance	8
6	**Disaster preparedness and management** - Fundamentals of emergency management, Psychological impact management, Resource management, Preparedness and risk reduction, information management, incident command and institutional mechanisms.	7
Total		**45 hrs**

Reference Books:

1. Washington Manual of Patient Safety and Quality Improvement Paperback – 2016 by Fondahn (Author)
2. Understanding Patient Safety, Second Edition by Robert Wachter (Author)
3. HandbookofHealthcareQuality& Patient SafetyAuthor : Girdhar J Gyani, Alexander Thomas
4. Researching Patient Safety and Quality in Healthcare: A Nordic Perspective Karina Aase, LeneSchibevaag
5. Old) Handbook Of Healthcare Quality & Patient Safety by GyaniGirdhar J (Author)
6. Handbook of Healthcare Quality & Patient Safety by .Gyani G J/Thomas A
7. Quality Management in Hospitals by S. K. Jos

BPFT2.6P - Community orientation & clinical visit (including related practicals to the parent course)(Total -120 hrs)

SKILL ENHANCEMENT ELECTIVE COURSE

Name of the Programme	**B.Sc. Perfusion Technology**
Name of the Course	**Medical Bioethics & IPR**
Course Code	**BPFT2.7**

Teaching Objective	• To introduce the wide range of ethical issues in health care. • To provide basic skills in: A) Approaching ethical issues. B) Analysis and statement of issues. C) Understanding the relevant ethical principles invoked. • Imparting knowledge and skills that will enable students to develop ethical answers to these issues • To acquire acquire specialized knowledge of law and IPR. • The main objective of the IPR is to make the students aware of their rights for the protection of their invention done in their project work.
Learning Outcomes	• Upon successful completion of the course, students will be able to: Recognize what constitutes an ethical concern in health care • Understanding ethical issues in Health care. • Understand better the complexity and multi-dimensionality of medical ethical concerns and uniqueness of each problem. • Capacity to rationally justify your decision • Develop the ability to reason through difficult medical/clinical ethical issues both orally, in the context of a group of their peers, and through written • The students get awareness of acquiring the patent and copyright for their innovative works. • They also get the knowledge of plagiarism in their innovations which can be questioned legally.

Sr. No.	Topics	No. of Hrs.
1	**Introduction to Bioethics** Bioethical issues related to Healthcare &Medicine	5
2	**Anatomy -** Cadaver ethics, Human dignity, PNDT, Disposal of cadaver, Genetic Counseling	7
3	**Physiology -** Animal ethics, Health policy privacy	7
4	**Biochemistry & Pathology -** Prudence of investigation confidentiality, Patients bill of rights, Disposal of investigative material, Integrity, Blood transfusion	5
5	**Pharmacology -** Rational drug prescribing, Clinical trials, Risk minimization, Animal ethics	5
6	**Microbiology -** Hand wash, Drug resistance minimization, Prudence of investigation confidentiality, Sterilization procedure, Biosafety and bio hazard	5
7	**Medicolegal aspects of medical records**	3
8	**Introduction to Intellectual Property**: Concept of Intellectual Property Kinds of Intellectual Property Patents, CopyrightsDesigns, Trademarks,Geographical Indication, Infringement of IPR, Its protection and Remedies Licensing and its types	8
Total		**45hrs**

Reference Books:

1. Contemporary issues in bioethics – Beauchamp &walters (B&W) 4th edition.
2. Classic philosophical questions by Gloud (8th Edition)
3. Case book series and booklets by UNESCO Bioethics Core curriculum 2008
4. Encyclopedia of Bioethics 5 vol set, (2003) ISBN-10: 0028657748
5. Intellectual property rights- Ganguli-Tat McGrawhill. (2001) ISBN-10: 0074638602,
6. Intellectual Property Right- Wattal- Oxford Publicatiopn House.(1997) ISBN:0195905024.

Name of the Programme	**B.Sc. Perfusion Technology**
Name of the Course	**Human Rights & Professional Values**
Course Code	**BPFT2.8**

Teaching Objective	• To understand interaction between society and educational institutions. • To sensitize the citizens so that the norms and values of human rights and duties of education programme are realized. • To encourage research activities. • To encourage research studies concerning the relationship between Human Rights and Duties Education.
Learning Outcomes	•This course will aim at making the learners acquire conceptual clarity and develop respect for norms and values of freedom, equality, fraternity and justice. • It will include awareness of civil society organizations and movements promoting human rights. • This will make the students realize the difference between the values of human rights and their duties

Sr. No.	Topics	No. of Hrs.
1	**Background -** Introduction, Meaning, Nature and Scope, Development of Human Rights, Theories of Rights, Types of Rights	6
2	**Human rights at various level**- Human Rights at Global Level UNO, **Instruments**: U.N. Commission for Human Rights, European Convention on Human Rights.	6
3	**Human rights in India -** Development of Human Rights in India, Human Rights and the Constitution of India, Protection of Human Rights Act 1993- National Human Rights Commission, State Human Rights Commission, Composition Powers and Functions, National Commission for Minorities, SC/ST and Woman	7
4	**Human Rights Violations -**Human Rights Violations against Women, Children, Violations against Minorities SC/ST and Trans-genders, Preventive Measures.	6
5	**Professional values**- Integrity, Objectivity, Professional competence and due care, Confidentiality	6
6	**Personal values**- ethical or moral values, Attitude and behavior- professional behavior, treating people equally	6
7	**Code of conduct**- professional accountability and responsibility, misconduct, Cultural issues in the healthcare environment	8
Total		**45hrs**

Reference Books:

1. JagannathMohanty Teaching of Human sRights New Trends and Innovations Deep & Deep Publications Pvt. Ltd. New Delhi2009
2. Ram Ahuja: Violence Against Women Rawat Publications Jewahar Nager Jaipur.1998.
3. SivagamiParmasivam Human Rights Salem 2008 Hingorani R.C.: Human Rights in India: Oxford and IBA New Delhi.

SEMESTER-III

Name of the Programme	**B.Sc. Perfusion Technology**
Name of the Course	**Applied Pharmacology**
Course Code	**BPFT3.1**

Teaching Objective	To understand Indication and Contraindications, Uses and Adverse effects of drugs, Mechanism of Action
Learning Outcomes	Students will be proficient in Pharmacology with proficient knowledge about the different drugs / medicines to be given in various cardiovascular diseases, dose calculation and mode of administration. Also recent advances in pharmacology will play a key role in research aspect of the students.

Sr. No.	Topics	No. of Hrs.
1.	**GENERAL PHARMACOLOGY:** Sources of drugs, Route of drug administration, Pharmacokinetics, Pharmacodynamics, First pass metabolism, Adverse drug reactions	5
2.	**DRUGS USED IN CARDIOVASCULAR SYSTEM (with its MOA, ADRs, Indications and complications):** Anti-Hypertensives, Anti- Anginal Agents, Anti-Failure Agents, Anti-Arrhythmic Agents, Antithrombotic Agents	10
3.	**DRUGS USED IN NERVOUS SYSTEM (with its MOA, ADRs, Indications and complications):** Anticholinergics & Adrenergic, Narcotics, Sedatives & Hypnotics	10
4.	**PHARMACOTHERAPY OF RESPIRATORY DISORDERS:** Introduction – Modulators of bronchial smooth muscle tone and pulmonary vascular smooth muscle tone, Pharmacotherapy of bronchial asthma, Mucokinetic and mucolytic agents	5
5.	**ANAESTHETIC AGENTS**: Definition of general and local anaesthetics. Classification of general anaesthetics, Pharmacokinetics and Pharmacodynamics of inhaled anaesthetic agents, Intravenous general anaesthetic agents, Local anaesthetics – classification mechanism of action, duration of action and methods to prolong the duration of action. Preparation, dose and routes of administration	10
6.	**ANALGESIC:** Definition and classification, Routes of administration, dose, frequency of administration, Side effects and management of non opioid and opiod analgesics.	5
7.	**ANTIHISTAMINES AND ANTIEMETICS**: Classification, Mechanism of action, adverse effects, Preparations, dose and routes and administration.	5
8.	**CNS STIMULANTS AND DEPRESSANTS**: Alcohol, Sedatives, hypnotics and narcotics, CNS stimulants , Neuromuscular blocking agents and muscle relaxants.	5

9.	**MISCELLANEOUS:** IV Fluids, Neuromuscular blockers, Electrolyte supplements, Antihistamines, Protamine, Emergency drugs- Atropine, Adrenaline, Steroids, Sodium bicarbonate	5
Total		**60 hrs**

Reference Learning Resources:

Text Books:

1. Pharmacology for Physiotherapy by Padmaja Udaykumar.
2. Drugs for the Heart, South Asia edition by Lionel H. Opie and Bernard J. Gersh
3. R. S. Satoskar, S.D. Bhandarkar, S. S. Ainapure, Pharmacology and Pharmacotherapeutics, 18th Edition
4. K.D. Tripathi, Essentials of Medical Pharmacology, V. Edition, M/s. Jaypee Brothers, Post Box, 7193, G-16, EMCA House, 23/23, Bansari Road, Daryaganj, New Delhi

Name of the Programme	**B.Sc. Perfusion Technology**
Name of the Course	**Applied Anatomy & Physiology of Cardiovascular System related to PT**
Course Code	**BPFT3.2**

Teaching Objective	Students will be aware of entire anatomy and physiology related to the cardiovascular system and other systems
Learning Outcomes	Students will be able to identify normal anatomy and vasculature and also be familiar with the pathologically diseased conditioned organs and changes in hemodynamics

Sr. No.	Topics	No. of Hrs.
1	**ANATOMY OF CARDIOVASCULAR SYSTEM:** Anatomy of Arteries and arterioles, Anatomy of Aorta, Capillaries and sinusoids, Anastomoses, Veins and venules, Anatomy of Coronary arteries: Left and Right	15
2	**PHYSIOLOGY OF CARDIOVASCULAR SYSTEM:** Physiology of Aorta, Physiology of Carotid Bifurcation, Systemic, Pulmonary, Coronary and Portal circulation, Nerve supply of the heart, Major Arteries and Veins supplying Head, Neck and Thorax, Major Arteries and Veins of Upper limb, Major Arteries and Veins of Pelvis and Lower Limb.	20
3	**ANATOMY OF HEART:** Surface anatomy of heart, Structure of the heart, Surface and Borders, Pericardium, Myocardium and Endocardium, Chambers: Right Atrium (Venous Area, Septum, Atrial Appendage), Right ventricle: (Inflow, Atrial Sinus, Outflow), Left Atrium (Venous, Ventricular Septum, Appendage, MV), Left Ventricle (Inflow, Body, Outflow), Anatomy of SA node and AV node, Anatomy of Cardiac Valves: Eustachian, Thebesian, A-V Valves, Semilunar Valves, Valve Apparatus Major Arteries and their branches Major veins and their tributaries	20
4	**BLOOD VESSELS AND HEMODYNAMICS:** Regulation of Blood pressure: Hormonal and Neural regulation, Pulse and sites for pulse assessment, Shock and Homeostasis, Innovation: Sympathetic and parasympathetic sensory	5
Total		**60hrs**

Recommended Learning Resources: Text Books:

(1) Textbook of Pathology, Harsh Mohan
(2) Pathology illustrated, Robin Reid
(3) B. D Chaurasia (volume 2)

Name of the Programme	**B.Sc. Perfusion Technology**
Name of the Course	**Applied Anatomy and Physiology of Cardiovascular System related to PT**
Course Code	**BPFT3.2P**

Teaching Objective	Students will be aware of entire anatomy and physiology related to the cardiovascular system and other systems
Learning Outcomes	Students will be able to identify normal anatomy and vasculature and also be familiar with the pathologically diseased conditioned organs and changes in hemodynamics

Sr. No	Topics	No. of Hours
1	**Heart :** Internal features of heart , External features ,Interior of the Right atrium , Interior of the left Atrium , interior of left and right ventricles , Nodal system **Vascular :** Blood supply of the heart , Anatomy of the coronary circulation **Great vessels** : Aorta and its branches , superior and inferior vena cavae , pulmonary vessels	15
2	**Lungs :** Interior and exterior features of the lungs , Pathological changes related to lungs and the heart (pnuemothorax , hydrothorax , hemothorax , cardiomegally , COPD, tumors , etc	15
3	**Hematology :** anemia , atherosclerosis , arteriosclerosis , plaque formations in the vasculature, Gross : pathological changes in congestive heart failure , myocardial infarction , hypertension	15
4	**Kidneys :** acute and chronic renal failure , liver cirrhosis and pancreatic dysfunctions related to pathology	15
	TOTAL	**60 hrs**

Name of the Programme	**B.Sc. Perfusion Technology**
Name of the Course	**Basics of Perfusion Technology**
Course Code	**BPFT3.3**

Teaching Objective	Students will be taught the overall physiology of CPB and investigations used to diagnose cardiac related disorders
Learning Outcomes	Students will understand the use of equipments in CPB and also hand on training with the equipments and materials used Students will be able to understand the principles and use of all the equipments and its making

Sr. No.	Topics	No. of Hrs.
1	**INVESTIGATIONS OF CARDIAC RELATED DISORDERS:** Chest X-rays (cardiomegaly, pneumothorax, pleural effusions) ECG (normal waves, changes in waveforms like atrial and ventricular arrhythmias, heart blocks, MI, myocardial ischemia) Echocardiography (principles, TTE,TEE and intra-oprative ECHO)	15
2	**CLINICAL PATHOLOGY:** Coronary Artery Disease (CAD), Congestive Heart Failure (CHF), and Atherosclerosis, Shock and Hemorrhage, Syncope, Hypertension. Congenital Disease, IHD, RHD, Valvular diseases, Myocardial Disease , Respiratory System (Normal structure, COPD, Pulmonary Infections, Tumors of the lungs, Diseases of pleura) Renal system (RFT, Renal Failure, Patho-physiology of Renal Failure	10
4	**EQUIPMENTS USED IN CPB AND HISTORY** **a.** History of Cardiac Surgery and **b.** History of Perfusion Technology **c.** Heart-Lung Machine: introduction, clinical use, practical and its theory **d.** Aseptic techniques (principles, definition, concept, technical aspect and clinical use) **e.** Theory and clinical use of Blood pumps (roller pumps, centrifugal pumps and other historical pumps) **f.** Oxygenators (introduction, theory, types, and its evolution) **g.** Various devices used in CPB: Arterial filters, bubble traps, Heat Exchangers, hemo- concentrators	20
	Total	**45hrs**

Recommended Learning Resources: Text Books:

(1) Manual of Clinical Perfusion, Byrian Lichh
(2) Cardio-pulmonary bypass: Surgical and Clinical orientation
(3) Handbook of Extra Corporeal Circulation
(4) Handbook of IV fluids and administration, S. Pandya
(5) The ABC's of Heart Diseases, William Herring
(6) Guide to Good Practise in Clinical Perfusion

Name of the Programme	**B.Sc. Perfusion Technology**
Name of the Course	**Basics of Perfusion Technology**
Course Code	**BPFT3.3P**

Teaching Objective	Students will be taught the overall physiology of CPB and investigations used to diagnose cardiac related disorders
Learning Outcomes	Students will understand the use of equipments in CPB and also hand on training with the equipments and materials used Students will be able to understand the principles and use of all the equipments and its making

Sr. No.	**Topics**	**No. of Hrs.**
1.	**Cardiopulmonary bypass protocols** - Pre-bypass checklist , circuit selection , circuit assembling , occlusion setting , circuit priming	20
2.	**Administration of drugs** – buffering agent, correction of hyperkalemia, hypokalemia, acidosis and alkalosis, metabolic dearrangements, drugs related to coagulation and anti-coagulation	20
3.	**Use of Equipments** – heart lung machine , heat cooler unit Use of devices – arterial filter , bubble trap , heat exchangers , hemo-concentrators	20
Total		**60 hrs**

Course code- BPFT3.4CP: PT Directed Clinical Education – I

Students will gain additional skills in medical equipment and radiation safety techniques. Students apply knowledge from previous clinical learning experience under the supervision of a senior technologist. Students are tested on intermediate technical skills.

(Total-360 hrs)

GENERIC ELECTIVE COURSE

Name of the Programme	**B.Sc. Perfusion Technology**
Name of the Course	**Pursuit of Inner Self Excellence (POIS)**
Course Code	**BPFT3.5**

Teaching Objective	To inculcate moral values in students – Self-Discipline, Time Management, Develop attitude of Service with humility, Empathy, Compassion, brotherhood, Respect for teachers, colleagues & society members. Develop Effective means of communication & presentation skills in students To develop wisdom in students for deciding their career based on their areas of interest and inner skills. Introduce techniques for Relaxation, Meditation & Connecting with inner self. Rejuvenation Techniques which can be used by students to distress themselves To improve performance of students during various assignments, projects, elocutions, events, quiz, interviews.
Learning Outcomes	Students will become self dependent, more decisive and develop intuitive ability for their study and career related matter. Student's ability to present their ideas will be developed. Enhanced communication skills, public speaking & improved Presentation ability. Students will be able to explore their inner potential and inner ability to become a successful researcher or technician & hence become more focused. Students will observe significant reduction in stress level. With the development of personal attributes like Empathy, Compassion, Service, Love & brotherhood, students will serve the society and industry in better way with teamwork and thus grow professionally.

Sr. No.	Topics	No. of Hrs.
1	**Spiritual Values for human excellence :** The value of human integration; Compassion, universal love and brotherhood (Universal Prayer) ; Heart based living ; Silence and its values, Peace and non-violence in thought, word and deed ; Ancient treasure of values - Shatsampatti, Patanjali's Ashtanga Yoga ,Vedic education - The role of the Acharya , values drawn from various cultures and religious practices - Ubuntu, Buddhism, etc.; Why spirituality? Concept – significance ; Thought culture	10
2	**Ways and Means :** Correlation between the values and the Courses ;Different teaching techniques to impart value education; Introduction to Brighter Minds initiative; Principles of Communication; Inspiration from the lives of Masters for spiritual values - Role of the living Master	15
3	**Integrating spiritual values and life:** Relevance of VBSE (Value Based Spiritual Education) in contemporary life ; Significant spiritual values ; Spiritual destiny ; Principles of Self-management; Designing destiny	10
4	**Experiencing through the heart for self-transformation (Heartfulness Meditation):** Who am I? ; Introduction to Relaxation; Why, what and how HFN Meditation?; Journal writing for Self-Observation ; Why, what and how HFN Rejuvenation (Cleaning)? ; Why, what and how HFN connect to Self (Prayer)?; Pursuit of inner self excellence ; Collective Consciousness-concept of *egregore effect*	10
Total		**45 hrs**

Books:

- The Art of Learning: **A Journey in the Pursuit of Excellence,** Josh Waitzkin, Simonand Schuster, 2007
- Reality at Dawn. By Shri Ram Chandra, Published by ISRC

Name of the Programme	B.Sc. Perfusion Technology
Name of the Course	Organizational Behavior
Course Code	BPFT3.6

Teaching Objective	To understand the initial insights into underlying principles and fundamental theories of organizational behavior. The Student should develop a sense of what falls under the domain of organizational behavior. He should develop an understanding of academic views on the behavior and motivations of people in organizations and the purposes of organizations. This course clearly takes an academic and scientific lens with the aim of understanding human behavior in organizations.
Learning Outcomes	• Describe and apply motivation theories to team andorganizational scenarios in order achieve a team's or an organization's goals and objectives. • Explain the effect of personality, attitudes, perceptions and attributions on their own and other's behaviors in team and organizational settings. • Explain types of teams and apply team development, teameffectiveness, and group decision making models and techniques. Analyze and apply leadership theories and better understand their own leadership style.

Sr. No.	Topics	No. of Hrs.
1	**Organizational Behavior** - Definition - Importance - Historical Background - Fundamental concepts of OB - 21st Century corporate - Different models of OB i.e. autocratic, custodial, supportive	6
2	**Organization Structure and Design** - Authority and Responsibility Relationships - Delegation of Authority and Decentralization - Interdepartmental Coordination - Emerging Trends in Corporate Structure, Strategy and Culture - Impact of Technology on Organizational design - Mechanistic vs Adoptive Structures – Formal and Informal Organization	8
3	**Perception Process** - Nature & Importance - Perceptual Selectivity - Perceptual Organization - Social Perception - Impression Management	6
4	**Learning** - Process of Learning - Principles of Learning - Organizational Reward Systems – Behavioral Management	6
5	**Motivation** - Motives - Characteristics - Classification of motives - Primary Motives - Secondary motives - Morale - Definition and relationship with productivity – Morale Indicators	6

6	Leadership - Definition - Importance - Leadership Styles - Models and Theories of Leadership Styles	7
7	Conflict Management - Traditional vis-a-vis Modern view of conflict - Constructive and Destructive conflict - Conflict Process - Strategies for encouraging constructive conflict - Strategies for resolving destructive conflict	6
Total		**45 hrs**

Books:

1. Organizational Behavior, 9th Ed. - Stephen Robbins
2. Human Behavior at work - Davis and Newstorm
3. Organizational Behavior - Uma Sekaran
4. Organizational Behavior - Fred Luthans
5. Organizational Behavior - K.Aswathappa
6. Human Behavior at Work - Keith Davis
7. Organizational Behavior - Jit S.Chandran
8. Human Relations & Organizational Behaviour - R.S.Dwivedi
9. Organizational Behavior - McShane

SEMESTER-IV

Name of the Programme	**B.Sc. Perfusion Technology**
Name of the Course	**Applied Physiology and Biochemistry**
Course Code	**BPFT4.1**

Teaching Objective	In this semester students will be guided about the investigations and tests performed to diagnose the patient and pre operative assessment
Learning Outcomes	At the end of this semester students will be able to evaluate, diagnose and help in treating the patients and differentiate patients eligible for taking for surgery or to be given meditational treatment

Sr. No.	Topics	No. of Hrs.
1	**PHYSIOLOGY OF CVS:** mechanism of cardiac contraction, cardiac cycle, stroke volume & cardiac output, Regulatory mechanism of CO, Normal pressures in all chambers of heart & great vessels, methods of measurement, description of wave forces of pressure tracings. Physiology of coronary circulation and its auto-regulation. CVS responses to exercise, posture and valsalva maneuver, conduction system of heart	10
2	**PHYSIOLOGY OF RESPIRATORY SYSTEM:** upper respiratory tract, mechanism of breathing, alveolar gas exchange, regulation of respiration, PFT and their interpretation, Arterial blood gas analysis, brief concepts of artificial ventilation	8
3	**HEMATOLOGY**: Blood components, normal value and their functions, Blood groups, Physiology of coagulation	3
4	**RENAL SYSTEM:** Introduction to renal physiology, renal circulation and glomerular filtration, tubular function	5
5	**NERVOUS SYSTEM:** physiological basis of consciousness and sleep, ANS, auto regulation of cerebral circulation, functions of brain and spinal cord	4
6	**BIOCHEMISTRY RELATED INVESTIGATIONS** and its theory : Principles and Estimation blood gas analysis and pH , principles and estimation of Electrolytes collection of samples for lab investigations (blood , urine , and other body fluids)	10
7	Cardiac Profile – Biochemical markers , basic principles and evaluation	5
	Blood Lipid Profile and its Interpretation Blood Sugar Profile and its Interpretation	
Total		**45 hrs**

REFERENCES

1. Textbook of physiology , A K Jain
2. Textbook of physiology , Sembulingam
3. Textbook of medical physiology , Guyton and Hall
4. Textbook of biochemistry, Pankaja Naik
5. Textbook of biochemistry, Ranjana Chawla

Name of the Programme	**B.Sc. Perfusion Technology**
Name of the Course	**Applied Physiology and Biochemistry**
Course Code	**BPFT4.1P**

Teaching Objective	In this semester students will be guided about the investigations and tests performed to diagnose the patient and pre-operative assessment
Learning Outcomes	At the end of this semester students will be able to evaluate, diagnose and help in treating the patients and differentiate patients eligible for taking for surgery or to be given meditational treatment

Sr. No	TOPIC	No. of Hours
1	**COMPONENTS OF BLOOD** - their normal values and function **BLOOD GROUPS** and briefly procedures involved in blood transfusion , blood grouping and cross matching , Bleeding time, clotting time, Erythrocyte sedimentation rate	25
2	**PULMONARY FUNCTION TEST** (including the use of spirometer) Brief Coagulation factors and Coagulation cascade Renal Physiology Renal function tests **PHYSICS OF VENTILATION -** principles of elasticity compliance and airway resistance.	10
3	**ROUTINE BIOCHEMICAL INVESTIGATIONS :** **CARDIAC PROFILES** – Biochemical Markers of myocardial infarction, basic principles, evaluation and application **BLOOD GAS ANALYSIS** : Principles and Estimation and pH Basic principles and estimation of electrolytes and their normal values Liver function test , Renal function tests, Thyroid Profile	25
	Total	**60 hrs**

Name of the Programme	**B.Sc. Perfusion Technology**
Name of the Course	**Introduction of Perfusion Techniques**
Course Code	**BPFT4.2**

Teaching Objective	Students will be taught to access the patients pre-operatively and understand the significance of pre existing factors which modify the changes with the selection of equipments and medicines used during cardiopulmonary bypass
Learning Outcomes	Students will be able to collect the data before and at the time of surgery for equipment evaluation

Sr. No.	Topics	No. of Hrs.
1	**PHYSICS OF CARDIOPULMONARY BYPASS:** a. Hemodynamics of (arterial flow, venous drainage, cardioplegia delivery, suction effect and venting b. Connection of the vascular system with extra corporeal circulation (ECC) : Cannulation techniques (selection of cannulae sizes, oxygenator selection), Calculation of BSA, BFR and other advanced formula c. Hazards of ECC: Oxygenator leakage, electricity cut off, Etc and its management during ECC	10
2	**MONITORING DURING CARDIOPULMONARY BYPASS**: Hemodynamic and hemostatic monitoring during CPB	10
3	**CONDUCTON AND TERMINATION OF CARDIOPULMONARY BYPASS**: Principles and Methodology **MYOCARDIAL PRESERVATION**: Hypothermia, Deep Hypothermic Circulatory Arrest, cardioplegia	10
4	Drugs used during CPB, Handling of Blood and Blood Products, Physiology of ECC Pulsatile and Non-pulsatile pumps, Physics of medical gases (oxygen, carbon dioxide)	15
Total		**45 hrs**

Recommended Learning Resources: Text Books:

(1) Manual of Clinical Perfusion, Byrian Lichh
(2) Cardio-pulmonary bypass: Surgical and Clinical orientation
(3) Handbook of Extra Corporeal Circulation
(4) Handbook of IV fluids and administration, S. Pandya
(5) The ABC's of Heart Diseases, William Herring
(6) Guide to Good Practise in Clinical Perfusion

Name of the Programme	**B.Sc. Perfusion Technology**
Name of the Course	**Introduction of Perfusion Techniques**
Course Code	**BPFT4.2P**

Teaching Objective	Teaching diagnosis and corrective methods of biochemistry investigations To know about blood transfusion and transfusion related problems Selection of equipment related of cardiopulmonary bypass
Learning Outcomes	Students will be aware of the hematologic derangements and the pharmacological application respectively Selection of the equipment and instrumentation related to cardiopulmonary bypass

Sr. No.	Topics	No. of Hrs.
1.	**Blood Gas Management** (pH , partial pressures of oxygen and carbon dioxide, base excess , sodium and chloride, potassium , meta – hemoglobin , alpha- hemoglobin, saturation, bicarbonate –intracellular and extracellular , total hemoglobin,) Glucose management	20
2.	**Blood transfusion** (blood grouping, cross-matching, blood grouping system, components of blood transfusion conditionally) Transfusion related problems	20
3.	**Calculation of –** Body Surface Area , blood volume calculation , priming volume , Circulating Haematocrit and haemoglobin on bypass Selection of cannula and other equipment related to the surgery , normal values	20
Total		**60 hrs**

Reference Books: Text Books:

1. Manual of ClinicalPerfusion
2. Cardiopulmonary bypass, Glenn Gravlee

Course code- BPFT4.3CP: PT Directed Clinical Education – IV

Students will gain additional skills in medical equipment and radiation safety techniques. Students apply knowledge from previous clinical learning experience under the supervision of a senior technologist. Students are tested on intermediate technical skills.

(Total- 450hrs)

ABILITY ENHANCEMENT ELECTIVE COURSE

Name of the Programme	**B.Sc. Perfusion Technology**
Name of the Course	**Computers and Applications**
Course Code	**BPFT4.4**

Teaching Objective	Learn IT applications in medicine and allied health care field. Introduction to health informatics. Understand the theories and practices adopted in Hospital Information Systems in the light of medical standards, medical data formats and recent trends in Hospital Information Systems.
Learning Outcomes	Discuss about health informatics and different IT applications in allied health care. Explain the function of Hospital Information Systems Analyze medical standards

Sr. No.	Topics	No. of Hrs.
1	**Introduction to computer**: Introduction, characteristics of computer, block diagram of computer, generations of computer, computer languages.	1
2	Input output devices: Input devices(keyboard, point and draw devices, data scanning devices, digitizer, electronic card reader, voice recognition devices, vision-input devices), output devices(monitors, pointers, plotters, screen image projector, voice response systems).	3
3	Processor and memory: The Central Processing Unit (CPU), main memory.	4
4	Storage Devices: Sequential and direct access devices, magnetic tape, magnetic disk, optical disk, mass storage devices.	3
5	Introduction of windows: History, features, desktop, taskbar, icons on the desktop, operation with folder, creating shortcuts, operation with windows (opening, closing, moving, resizing, minimizing and maximizing, etc.).	5
6	Introduction to MS-Word: introduction, components of a word window, creating, opening and inserting files, editing a document file, page setting and formatting the text, saving the document, spell checking, printing the document file, creating and editing of table, mail merge.	5
7	Introduction to Excel: introduction, about worksheet, entering information, saving workbooks and formatting, printing the worksheet, creating graphs.	5
8	Introduction to power-point: introduction, creating and manipulating presentation, views, formatting and enhancing text, slide with graphs.	5
9	Introduction of Operating System: introduction, operating system concepts, types of operating system.	4

10	Computer networks: introduction, types of network (LAN, MAN, WAN, Internet, Intranet), network topologies (star, ring, bus, mesh, tree, hybrid), components of network	5
11	Internet and its Applications: definition, brief history, basic services (E-Mail, File Transfer Protocol, telnet, the World Wide Web (WWW)), www browsers, use of the internet.	4
12	Application of Computers in clinical settings.	1
Total		**45 hrs**

Text books:

1. Mausner & bahn : Epidemiology-An Introductory text, 2nd Ed.,W.B.Saunders Co.
2. Richard f. Morton & j. Richard hebd : A study guide to Epidemiology and Biostatistics, 2nd Ed., University Park Press, Baltimore.
3. Sylvia W Smoller, J Smoller, Biostatistics & Epidemiology A Primer for health and Biomedical professionals, 4th edition, Springs, 2015

Name of the Programme	**B.Sc. Perfusion Technology**
Name of the Course	**Biostatistics and Research Methodology**
Course Code	**BPFT4.5**

Teaching Objective	• To enable students to present, analyze and interpret data. • To enable students to use concepts of probability in business situations. • To enable students to make inferences from samples drawn from large datasets. • To enable students to apply univariate and multivariate statistical techniques.
Learning Outcomes	• To understand the importance & Methodology for research • To learn in detail about sampling, probability and sampling distribution, significance tests correlation and regression, sample size determination, study design and multivariate analysis.

Sr. No.	Topics	No. of Hrs.
1	Introduction to research methods	5
2	Identifying research problem	5
3	Ethical issues in research	5
4	Research design	5
5	Basic Concepts of Biostatistics	5
6	Types of Data	5
7	Research tools and Data collection methods	5
8	Sampling methods	5
9	Developing a research proposal	5
Total		**45 hrs**

Text books:

1. Mausner & bahn : Epidemiology-An Introductory text, 2nd Ed.,W. B .Saunders Co.
2. Richard f. Morton & j. Richard hebd : A study guide to Epidemiology and Biostatistics, 2nd Ed., University Park Press, Baltimore.
3. Sylvia W Smoller, J Smoller, Biostatistics & Epidemiology A Primer for health and Biomedical professionals, 4th edition, Springs, 2015

SEMESTER-V

Name of the Programme	**B.Sc. Perfusion Technology**
Name of the Course	**Perfusion Technology: Clinical**
Course Code	**BPFT5.1**

Teaching Objective	• To understand the use of various drugs and intravenous fluids used during cardiopulmonary bypass • Understanding hematologic effects and physics of cardiopulmonary bypass
Learning Outcomes	• To learn the pharmacokinetics and pharmacodynamics during cardiopulmonary bypass • Dealing with conduction and termination of cardiopulmonary bypass and problems associated with it

Sr. No.	Topics	No. of Hrs.
1	**CPB**: Conduct and monitoring of Cardiopulmonary bypass	10
2	**Adequacy of perfusion** – General considerations, specific aspects of perfusion, Monitoring, other concomitants which may affect its adequacy	6
3	**Pulsatile perfusion** – Introduction, theory & physiology of pulsatile flow, Hemodynamic, metabolic effects, Clinical use, hematological effects	6
4	Hemodynamic, metabolic effects, Clinical use, hematological effects, Cannulation techniques during cardiopulmonary bypass	7
5	**Termination of cardiopulmonary bypass** – principles and methodology	8
6	**Myocardial protection and cardioplegia**- pretreatment of the Myocardium, cardioplegia, hypothermia, controlled reperfusion, myocardial protection for specific clinical problems, Complications of cardioplegia. Non cardioplegic methods during cardiac surgery on cardiopulmonary bypass	8
7	**Oxygenation –** general consideration, bubble & membrane (including assessment and comparison of oxygenator function)	6
8	**Heat exchangers**-principles function of heat exchangers & their assessment. Complications related to heat exchange and their management	4
9	Priming fluids and hemodilution	5
Total		**60 hrs**

Recommended Text Books:

(1) Manual of Clinical Perfusion, Byrian Lichh
(2) Cardio-pulmonary bypass: Surgical and Clinical orientation
(3) Handbook of Extra Corporeal Circulation
(4) Handbook of IV fluids and administration, S. Pandya
(5) The ABC's of Heart Diseases, William Herring
(6) Guide to Good Practise in Clinical Perfusion

Name of the Programme	B.Sc. Perfusion Technology
Name of the Course	**Perfusion Technology: Clinical**
Course Code	BPFT5.1P

Teaching Objective	To understand the use of various drugs and intravenous fluids used during cardiopulmonary bypass Understanding hematologic effects of cardiopulmonary bypass
Learning Outcomes	To learn the pharmacokinetics and pharmacokinetics during cardiopulmonary bypass Dealing with conduction and termination of cardiopulmonary bypass Selection of appropriate equipments and instruments

Sr. No.	Topics	No. of Hrs.
1	**Oxygenators** – selection of oxygenators, difference between oxygenators, adult and pediatric and neonatal setup, oxygenator accidents, change of oxygenator in the ongoing surgery **Custom tubing pack** – selection with regards to oxygenator, quality determination demonstration, difference between disposable and reusable equipments and its clinical use	20
2	**Use of hemotherm** (heater cooler unit) and its connection with the extra corporeal circulation **Hypothermia methods** in case of failure of the hemotherm	20
3	**Myocardial Preservation techniques** – pre treatment of the myocardium Cardioplegia delivery techniques and hypothermia techniques Complications during delivery of cardioplegia and management of the same	20
Total		**60 hrs**

Name of the Programme	**B.Sc. Perfusion Technology**
Name of the Course	**Perfusion Technology: Applied**
Course Code	**BPFT5.2**

Teaching Objective	• To know the intracellular and extracellular effects during cardiopulmonary bypass and cardiac surgery • To understand the effects of the surgical procedure and also the drawbacks of the inflammatory response
Learning Outcomes	• Techniques that can minimise the ill effects of the machinery and to improve patient outcome and the activated systemic inflammatory response system

Sr. No.	Topics	No. of Hrs.
1	**Blood cell trauma** – analysis of forces of fluid motion, effects of physical forces on Blood cell, clinical effect. Complications of blood transfusion	10
2	**Anticoagulation on bypass**, its monitoring, its reversal and complications. Heparin less Bypass. Platelet aggregation and platelet dysfunction. Coagulopathies due to Cardiopulmonary bypass and its management.	6
3	**Inflammatory response to cardiopulmonary bypass & its clinical effects.** Methods to minimize the same. Immune response, neuroendocrine, renal, metabolic splanchnic response, pulmonary response and electrolyte response to cardiopulmonary bypass	6
4	**Blood conservation hemofiltration & dialysis** during cardiopulmonary bypass including modified ultrafiltration , reverse autologous priming and other methods	6
5	**Micro emboli**- gaseous and particulate, filters used in cardiopulmonary bypass circuit	6
6	Micro pore filtration during cardiopulmonary bypass	6
7	Counter pulsation techniques and assist devices	5
Total		**45 hrs**

Name of the Programme	B.Sc. Perfusion Technology
Name of the Course	**Perfusion Technology: Applied**
Course Code	BPFT5.2P

Teaching Objective	To know the intracellular and extracellular effects during cardiopulmonary bypass and cardiac surgery To understand the effects of the surgical procedure and also the drawbacks of the inflammatory response
Learning Outcomes	Techniques that can minimise the ill effects of the machinery and to improve patient outcome and the activated systemic inflammatory response system

Sr. No.	Topics	No. of Hrs.
1	• anti-coagulation during cardiopulmonary bypass and its reversal • Management of coagulopathies, platelet aggregation and platelet dysfunction	20
2	• Use of the Intra Aortic Balloon Pump (IABP) – normal, complications of IABP, Management • Demonstration of the use of centrifugal pumps, right ventricular assist devices, left ventricular assist devices and biventricular assist devices. • Use of equipments in organ transplantation and drugs	20
3	• Blood conservation techniques – use of equipment , hemo concentrators, leukocyte filters, other blood filters, miniaturized circuit, banked-blood filters, screen filters, depth filters, • cell salvaging machine • Modified ultrafiltration , conventional ultrafiltration, zero-balanced ultrafiltration, pre bypass ultrafiltration	20
Total		**60 hrs**

Reference Text Books:

1. Cardiopulmonary bypass, Glenn Gravlee
2. Handbook of clinical perfusion, ISECT CON BOOK – 2017 & latest editions
3. Manual of Clinical Perfusion, Byrian Lichh
4. Cardio-pulmonary bypass: Surgical and Clinical orientation
5. Handbook of Extra Corporeal Circulation
6. Handbook of IV fluids and administration, S. Pandya
7. The ABC's of Heart Diseases, William Herring
8. Guide to Good Practise in Clinical Perfusion

Course code- BPFT5.3CP: PT Directed Clinical Education – V

Students will gain additional skills in interventional procedures, cardiac pharmacology and recent advancements. Students apply knowledge from previous clinical learning experience under the supervision of a senior technologist. Students are tested on intermediate pharmacological and invasive techniques.

(Total- 450 hrs)

CORE ELECTIVE COURSES

Name of the Programme	**B.Sc. Perfusion Technology**
Name of the Course	**Basics of Clinical Skill Learning**
Course Code	**BPFT5.4**

Teaching Objective	•To Understand the basic ideas on how to check for Vital Signs of the Patient • This course the Student will learn how to handle the patients and their positioning •They will also learn on the Basics of Nasal-Gastric Tube •The Students will learn on Administration of IV, IV and Medication •Also they will know about Cleanliness in the Asepsis
Learning Outcomes	•After successful accomplishment of the course, the students would be able to Measure Vital Signs, do basic physical Examination of the patients, NG tube basics, Administration of Medicines •The students will learn about Asepsis, and the Cleanliness related to asepsis and on mobility of the patients

Sr. No.	Topics	No. of Hrs.
1	**MEASURING VITAL SIGNS:** Temperature: Axillaries Temperature, Pulse: Sites of pulse, Measurement, Respiratory, Blood Pressure, Pain: Pain Scale	5
2	**PHYSICAL EXAMINATION:** Observation, Auscultation (Chest), Palpation, Percussion, History Taking	10
3	**FEEDING: ENTRAL FEEDING, NG TUBE:** Measurement, Procedure, Care, Removal of Nasal-Gastric Tube, Nasal-Gastric Tube Feeding, and Parenteral Nutrition.	10
4	**ADMINISTRATIONS:** Oral, Intravenous, Intramuscular, Subcutaneous, Recapping of Syringe, Loading of Drugs, Calculation of Drugs, Venipuncture, IV Infusion, Cannula, Attachment of IV infusion Set, Fluid Collection, Heparin Lock, Maintenance of IV set, Performing Nebulizer Therapy, Inhaler, Oxygen Therapy (Nasal, prongs, nasal Catheter, Venturi Mask, face mask)	10
5	**ASEPSIS:** Hand wash Techniques, (Medical, Surgical) Universal Precaution, Protecting Equipment's: Using Sterile Gloves, Opening a Sterile package and Establishing a Sterile Field, Sterile Dressing Changes, Surgical Attire, Wound Dressing, Suture Removal, Cleaning and Application of Sterile Dressing, Wearing and Removal of personal protective Equipment	5
6	**MOBILITY AND SUPPORT:** Moving and Positioning, range of Motion exercises (Active & Passive) Assisting for Transfer, Application of Restraints	5
Total		**45 hrs**

Name of the Programme	**B.Sc. Perfusion Technology**
Name of the Course	**Hospital Operation Management**
Course Code	**BPFT5.5**

Teaching Objective	•To promote scientific management of hospital and advancement ofhealth care systems so as to make it rational, responsive and cost efficient •To promote the development of high quality of hospital care inthe community and the country. •It has to provide a satisfactory environment to the patient and also to the doctors for clinical research.
Learning Outcomes	•Understand and apply resource management concepts (personnel, finance, and material resources) and the processes and strategies needed in specific hospital sectors •Communicate effectively and develop their leadership and teambuilding abilities •Apply modern change management and innovation management concepts to optimize structures •Analyze existing hospital service policies and enhance their alignment within the local and national context

Sr. No.	Topics	No. of Hrs.
1	**MEDICO-LEGAL CASES:** Introduction: Laws associated with Medico-Legal Cases, Three Core Contents in Medico-legal cases w.r.t Doctors, Patient & Profession,	5
2	**CONSIDERATIONS OF ETHICS:** Consent, Confidentiality, Mental Health, End of life and Organ Transportation, Research & Clinical Trials	10
3	**HOSPITAL INFORMATION SYSTEM(HIS):** Hospital Information System Management, software applications in registration, billing, investigations, reporting, medical records management, Security and ethical challenges	10
4	**EQUIPMENT OPERATIONS MANAGEMENT:** Hospital equipment repair and maintenance, types of maintenance, job orders, equipment maintenance log books, AMCS	10
5	**ROLE OF MEDICAL RECORDS IN HEALTH CARE MANAGEMENT:** Computers for Medical records, Developments of computerized medicalrecord information processing system (EMR's), Computer stored (Vs) Manual hand written record, Advantages of EMR (Vs) Manual	10
Total		**45hrs**

SEMESTER-VI

Name of the Programme	**B.Sc. Perfusion Technology**
Name of the Course	**Perfusion Technology : Advanced**
Course Code	**BPFT6.1**

Teaching Objective	• Knowledge of the use of various equipments in cardiac surgery operations • Advancement in extra corporeal life support for cardiac and pulmonary patients • Different complications related to pediatric surgical intervention
Learning Outcomes	• Use of machinery and amenities during emergency cases and conditions • Management of complications related to bypass and advanced extra corporeal life support • Team management of perfusion accidents and management

Sr. No.	Topics	No. of Hrs.
1	Cannulations techniques during cardiac surgery – arterial cannulation , venous cannulations , root venting and the cardiac chamber venting cannulations, selection of cannulae , position and securing of the cannula	15
2	Conduction of cardiopulmonary bypass and its monitoring – preparation for conduction , ABG and VBG analysis , ACT analysis , theory and clinically done test for anti-coagulation (ApTT, PT, INR, heparin monitoring, Etc)	10
3	Heat exchangers – principle , function and its assessment Complications related to heat exchangers and its management	10
4	Termination of cardiopulmonary bypass – principle and methodology including the beginning of the pulmonary ventilation and anaesthesia , inotrophic and dronotrophic support, Analysis of blood parameters	15
5	Blood conservation , hemofiltration and dialysis during CPB including the concept of modified ultrafiltration , conventional ultrafiltration, zero balanced ultrafiltration Reverse autologous priming and other new methods Filters used during CPB – arterial filters , bubble traps , gas filter , screen filter , depth filter , combination filter, banked blood filters , ultrafilters, cardiotomy filters and others Micro –emboli and gaseous particulate	10
Total		**60 hrs**

Name of the Programme	**B.Sc. Perfusion Technology**
Name of the Course	**Perfusion Technology: Advanced**
Course Code	**BPFT6.1P**

Teaching Objective	• Advancement in extra corporeal life support for cardiac and pulmonary patients • Different complications related to pediatric surgical intervention
Learning Outcomes	• Management of complications related to bypass and advanced extra corporeal life support • Team management of perfusion accidents and management

Sr. No.	**Topics**	**No. of Hrs.**
1	ECMO- special perfusion techniques for special cardiac surgeries and medical conditions (including thoracic aortic surgeries deep hypothermia and circulatory arrest). Perfusion for non- cardiac surgery, invasive cardiology and outside the operation suite. Peripheral bypass - femoral-femoral bypass , cannulations for peripheral bypass, vaccumm assisted venous drainage , kinetic augmented venous drainage , suction bypass	30
2	Perfusion techniques for Pediatric cardiac surgery Complications and safety during cardiopulmonary bypass – bypass safety , organizational aspects, accidents, coagulopathies, mechanical and electrical failures, perfusion management, perfusion systems, safety for the perfusionist and surgical Team management of perfusion accidents.	30
Total		**60 hrs**

Name of the Programme	B.Sc. Perfusion Technology
Name of the Course	Recent advances in Cardiopulmonary bypass & Perfusion
Course Code	BPFT6.2

Teaching Objective	•To provide the critical information to students when beginning with uptake of the cardiopulmonary bypass •To provide an extension of techniques and methods described for diagnostic catheterization and specially related techniques.
Learning Outcomes	•The students will gain knowledge about chances of a successful procedure. •To enable students, understand about benefit/risk to the patient if the procedure is successful/ unsuccessful •The occurrence and management of various complications.

Sr. No.	Topics	No. of Hrs.
1	Perfusion techniques for Pediatric cardiac surgery	6
2	ECMO- special perfusion techniques for special cardiac surgeries and medical conditions (including thoracic aortic surgeries deep hypothermia and circulatory arrest). Perfusion for non- cardiac surgery, invasive cardiology and outside the Operation suite.	6
3	Perfusion as a method of cardiopulmonary bypass	6
4	Complications and safety during cardiopulmonary bypass – bypass safety, organizational aspects, accidents, coagulopathies, mechanical and electrical failures, perfusion management, perfusion systems, safety for the perfusionist and surgical team management of perfusion accidents.	8
5	Minimally invasive surgery and the perfusionist	8
6	Recent advances in perfusion techniques	6
7	Experimental perfusion	5
Total		**45 hrs**

Recommended Text Books:

1. Manual of Clinical Perfusion, Byrian Lichh
2. Cardio-pulmonary bypass: Surgical and Clinical orientation
3. Handbook of Extra Corporeal Circulation
4. Handbook of IV fluids and administration, S. Pandya
5. The ABC's of Heart Diseases, William Herring
6. Guide to Good Practise in Clinical Perfusion

Course code- BPFT6.3CP: PT Directed Clinical Education – VI

Students will gain additional skills in diagnosis in pediatric cases and pediatric interventional procedures. Students apply knowledge from previous clinical learning experience under the supervision of a senior technologist. Students are tested on intermediate clinical diagnostic and therapeutic skills. **(Total – 450 hrs)**

INTERNSHIP

Guidelines:

1. The internship shall commence after the student has completed and passed all Courses up to VI semesters.
2. The internship is compulsory.
3. The duration of the internship shall be 6 Months.
4. The degree of Bachelor in Allied Health Sciences shall be awarded after the satisfactory completion of the internship.

Evaluation of Internees:

Formative Evaluation:

Day to day assessment of the internees during their internship postings should be done by the Head of the Department/Faculty assigned. The objective is that all the interns must acquire necessary minimum skills required for carrying out day to day professional work competently. This can be achieved by maintaining Records /Log Book by all internees. This will not only provide a demonstrable evidence of the processes of training but more importantly of the internee's own acquisition of competence as related to performance

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Summative Evaluation:

It shall be based on the observation of the Sr. Technical staff / Faculty of the department concerned and Record / Log book maintained by the interns. Based on these two evaluations, the Head of the Department shall issue certificate of satisfactory completion of training, following which the university shall award the degree or declare him/her eligible for it.

To implement the project work uniformly for all the specialties in view of the curriculum and training to be acceptable internationally and the students to get opportunity for higher studies and employment.

REGISTRAR
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