



SRI DEVARAJ URS ACADEMY OF HIGHER EDUCATION AND RESEARCH

(A Deemed to be University Declared under Section 3 of UGC Act, 1956)

Comprising Sri Devaraj Urs Medical College

[Constituent Unit of Sri Devaraj Urs Educational Trust for Backward Classes (Regd.)]

TAMAKA, KOLAR-563103, KARNATAKA, INDIA

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(With effect from 2016-17 batches)

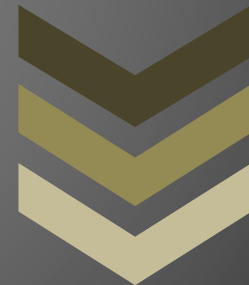
Choice Based Credit System Based Graduate Curriculum for Bachelor of Science in Renal Dialysis Technology

Dean

Faculty of Allied Health Sciences
Sri Devaraj Urs Academy of
Higher Education & Research
Tamaka, Kolar-563 101

Approved as per BOM-41-2016,(Resolution No-XLI-05(3)/16) Dated-19/10/2016

REGULATIONS GOVERNING THE BACHELOR OF SCIENCE (B.Sc.) DEGREE UNDER CHOICE BASED CREDIT SYSTEM



2016

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(Declared as Deemed - to - be University u/s 3 of the UGC Act

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REGULATIONS GOVERNING

THE BACHELOR OF SCIENCE (B.Sc.)

DEGREE

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**REGULATIONS GOVERNING THE DEGREE OF BACHELOR
OF SCIENCE (B.Sc.)**

**CHOICE BASED CREDIT SYSTEM IN ALLIED HEALTH
SCIENCES**

INTRODUCTION

The University Grants Commission has brought in numerous measures to enhance equity, efficiency and excellence in the higher education system in the country. Consequently, has set considerable effectiveness with noticeable improvements in higher education system. Even though, there existed diversity in the evaluation system in Universities in India and to mitigate tremendous diversity adapted in Universities, UGC issued circular D.O.No. F.1-2/2008 (XI Plan) dated March 2009 and further in its circular D.O.No.F-1-1/2014 dated 12th November 2014 has directed all the Universities in the country to implement the Choice Based Credit system (CBCS) scheme to all the undergraduate and post graduate level degrees Programs mandatorily.

In compliance to the above, Sri Devaraj Urs Academy of Higher Education and research [SDUAHER] has notified with vide No SDUAHER/KLR/ADMN/2063/16-17 dated 20.10.16 and introduced CBCS for undergraduate Programs (B.Sc.) in order to achieve academic excellence, quality improvement and as administrative reforms. Based on this background, SDUAHER has framed REGULATION governing B.Sc. Programs under Faculty of Allied Health Sciences.

This facilitates flexible learning; multifaceted development of students with wide variety of courses viz core, electives in discipline specific, Ability enhancement and open to enhance their knowledge and skills. This qualitative change in the Programs is to the global requirements and aspiration of students and stake holders for mobility both within and across the geographical jurisdiction.

CBCS implementation brings desired uniformity in grading system and method for computing semester grade point average (SGPA) for semester performance and cumulative Grade Point average (CGPA) for overall program performance of students in the examinations.

DEFINITIONS OF KEY WORDS

Applicable to undergraduate, postgraduate level degree, diploma and certificate Programs under the choice based credit system in semester scheme.

1. University: Sri Devaraj Urs Academy of Higher Education and Research Tamaka, Kolar

2. Academic Year consists of two consecutive semesters a) Even semester (scheduled from January to June) b) Odd semester (scheduled between July to December).

3. Semester: Each semester will consists of 15-18 weeks of academic work equivalent to 90 actual teaching days.

4. Choice Based Credit System (CBCS): Provides choice for students to select from the prescribed courses/papers such as core, elective or minor or soft skill courses offered in a Program.

5. 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.

6. Program: An educational program leading to award of a Degree, diploma or certificate.

7. Course usually referred to as 'papers' is a component of a program. *All courses May 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/ field work/ outreach activities/ project work/ vocational training/viva/ seminars/ term papers/assignments/ presentations/ self-study etc. or a combination of some of these.

8. Branch: Specialization or discipline of B.Sc. Degree Programs are like Medical Laboratory technology, Imaging technology, optometry, renal dialysis technology, operation theater technology, radiotherapy technology etc.

9. Letter Grade: It is an index of the performance of students in a said course. Grades are denoted by letters O, A+, A, B+, B, C, P, F and Ab

10. Grade Point: It is a numerical weight allotted to each letter grade on a 10-point scale

11. **Credit:** Each course shall carry certain number of credits. Credits normally represent the weightage of a course and are a function of teaching, learning and evaluation strategies such as number of contact hours, the course content, teaching methodology, learning expectations, etc. In the proposed Programs, credit is a unit by which course work is measured. Credit determines the number of hours of instructions required per week, generally, one credit is equivalent to one hour of teaching [lecture or tutorial] or 2 hours of practical work /field work per week.

12. **Credit Point:** It is the product of grade point and number of credits for a course.

13. **Semester Grade Point Average (SGPA):** It is a measure of performance of work done in a semester. It is ratio of total credit points secured 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.

14. **Cumulative Grade Point Average (CGPA):** It is a measure of overall cumulative Performance of a student over all semesters. The CGPA is the ratio of total credit points secured by a student in various courses in all semesters and the sum of the total credits of all courses in all the semesters. It is expressed up to two decimal places.

15. **First Attempt:** A student who has completed all formalities of the semester becomes eligible to attend the examinations and has passed in first sitting; such attempt shall be treated as first attempt.

16 **Transcript or Grade Card or Certificate:** Based on the grades earned, a grade Certificate shall be issued to all the registered students after every semester. The grade Certificate will display the course details (code, title, number of credits, grade secured) along with SGPA of that semester and CGPA earned till that semester.

B.Sc. PROGRAMS STRUCTURE

Semester	Program structure
I	Basic medical sciences Common to all disciplines as mandatory core courses (CC), Compulsory foundation course (FC) Discipline specific elective (DSE)
II	Basic medical sciences Common to all disciplines as mandatory core courses (CC), Compulsory foundation course (FC) Discipline specific elective (DSE) Ability enhancement course (AEC)
III	Core courses discipline wise (CCD) Skill enhancement course (SEC)
IV	Core courses discipline wise Ability enhancement course (AEC)
V	Core courses discipline wise (CCD) Skill enhancement course (SEC)
VI	Core courses discipline wise (CCD) Ability enhancement course (AEC)
VII	Internship

In CBCS, UG degree Programs offered in University are structured to have 7 semesters will have credits in the range of 20 to 26 an average of 23 credits per semester and a total of around 120-156 credits per under graduate program.

STRUCTURE OF B.Sc. PROGRAMS UNDER CBCS SCHEME

Semester	Core courses (1-19)	Discipline specific elective (DSE)	Ability enhancement Compulsory Course (AEC)	Skill enhancement courses (SEC)	Open elective (OE)	Foundation course
I	Paper 1 Paper 2 Paper 3 Paper 4	DSE-1 DSE-2 DSE-3 DSE-4	-	-	-	Basic Computer Application
II	Paper-1 Paper 2 Paper 3	DSE-1 DSE-2 DSE-3 DSE-4 DSE-5 DSE-6	Environmental science	-	-	English communication
III	Paper-1 Paper 2 Paper 3	-	-	SEC-1 (SAFE-I)	-	-
IV	Paper 1 Paper 2 Paper 3	-	Constitution of India	-	-	-
V	Paper 1 Paper 2 Paper 3	-	-	SEC-2 Medical Ethics	-	-
VI	Paper 1 Paper 2 Paper 3	-	Quality control	-	-	-
VII	Internship					

Types of courses. 3 types, such as core, elective and foundation

Core courses: This is the course/paper which is to be compulsorily studied by a student as a core requirement to complete the requirement of a program in a said discipline of study.

Foundation Course: 2 kinds:

1. **Compulsory Foundation courses:** mandatory to all disciplines, which based upon the content that leads to Knowledge enhancement.
2. **Elective foundation courses:** are value-based and are aimed at man-making education.

Elective courses:

This can be chosen from a pool of electives listed in University. It is expected to Support to the discipline of study, provide an expanded scope, enable an exposure to some other discipline/domain and nurture student's proficiency/skill.

An elective may be "Discipline centric" or may be chosen from an unrelated discipline. It may be called an "Open Elective."

3. CREDIT STRUCTURE FOR COURSE

Example : SEMESTER-I

courses	Lectures hours /week In a semester	Tutorials hours /week in a semester	Lab work hours /week in a semester	credits	Total credits
Course-I	02	01	02	2:1:1	04
Course-II	02	01	02	2:1:1	04
Course-III	02	01	02	2:1:1	04
Course-IV	02	01	02	2:1:1	04
Compulsory Foundation course	02	-	02	2:0:1	03
Discipline specific Elective	01	-	-	0:0:1	01
				Total	20

Course-1 Anatomy paper-1

Course-II anatomy paper 2

Course-III Physiology paper1

Course-IV Physiology paper2

Compulsory foundation course: Basics in computer applications

Discipline Specific electives (anatomy histological techniques and Physiology PFT and ECG)

**REGULATIONS GOVERNING THE DEGREE OF B.Sc. PROGRAMS AS
PER CHOICE BASED CREDIT SYSTEM UNDER THE FACULTY OF
ALLIED HEALTH SCIENCES**

1. TITLE

The undergraduate programs known as Bachelor of Science abbreviated as B.Sc.

B. Sc. Programs are as under

- Bachelor of science in Medical laboratory Technology
- Bachelor of science in Imaging Technology
- Bachelor of Science in Optometry
- Bachelor of Science in operation Theater Technology
- Bachelor of Science in Renal Dialysis technology
- Bachelor of Science in Radiotherapy Technology

2. DURATIONS

The duration of the under graduate Programs shall be three and half years consists of 7 semesters including internship.

3. CALENDAR OF EVENTS

The calendar of events in respect of each program of study shall be fixed by the University from time to time. The examination in all programs of study shall be conducted at the end of each semester.

4 ELIGIBILITY FOR ADMISSION

A Candidate seeking admission to B.Sc. program

Shall have passed two years Pre University examination conducted by the pre University board of Karnataka state, with English as one of the subject and physics, chemistry and biology as optional subjects.

OR

Shall have passed any other examination conducted by Boards/councils/intermediate examination established by state Government/central Government and recognized as equivalent to two year pre University examination by the Rajiv Gandhi University of health sciences/Association of Indian Universities (AIU) , with English as one of the subjects and physics, chemistry and biology as optional subjects and the candidate shall have passed subjects of English, physics, chemistry and biology individually.

OR

Shall have passed intermediate examination in science of an Indian university/ Boards/council or other recognized examining bodies with physics ,chemistry and biology which shall include a practical test in these subjects and also English as compulsory subject.

the candidate shall have passed subjects of English, physics, chemistry and biology individually.

OR

Candidates with regular three years diploma in respective discipline recognized by Rajiv Gandhi University of health sciences

OR

The minimum marks for the purpose of eligibility shall be forty percent (40%) in optional subjects in case of students belonging to SC/ST and OBC students from Karnataka or as decided by the Government of Karnataka. Provided further that, the student shall have studied and passed English as one of the subjects.

Candidates who have completed diploma or vocational course through correspondence shall not be eligible for Bachelor of Science Programs.

5 LATERAL ENTRY

Candidates passing diploma in concerned discipline and 10+2 or PUC shall be eligible for Lateral entry i.e. admission to II year / semester –III of the B.Sc. Program. However, this will be entertained only if vacancies are available. Applicants should possess minimum of 45 % aggregate marks in PUC (PCMB).

6 ATTENDANCES

Each course comprising theory & Practical and tutorials shall be treated as single unit for the purpose of calculation of attendance. A student shall have to attend a minimum of 75% attendance of the total instruction hours in a course (theory/practical/tutorials) in each semester from the date of commencement of the semester to last working day as notified by the University.

The students shall be informed about their attendance status periodically by the department of Allied health sciences. So that, the students shall be cautioned to make up the shortage. The Department of Allied Health sciences shall submit the list of students who have been eligible to appear examinations and list of detained students due to shortage of attendance by the end of the semester to the Controller of Examinations.

Students lacking in the prescribed attendance and progress in any subject(s) in theory and practical should not be permitted to appear for the examination. Such student shall repeat the course in which he/she is deficient with attendance.

7. MAXIMUM PERIOD FOR COMPLETION OF THE PROGRAMS

The candidate shall complete the program generally within the twice the number of years of the program from the date of commencement of the program i.e. within six years from the date of admission. If the candidate fails to complete the program within the period permitted he/she will be discharged from the University. However, fee to be paid for repeating the semesters.

8. MEDIUM OF INSTRUCTION: The medium of instruction shall be English.

9. TEMPORARY DISCONTINUATION OF THE PROGRAM

A student, who wishes to temporarily discontinue the program and continue the same subsequently, has to obtain prior permission from the University by applying through the head of the department. Such students have to take readmission to the same semester/year in the subsequent session. However, the student shall complete the course as per the maximum period fixed by the University

10. HOURS OF INSTRUCTION PER WEEK

These number of hours of instruction for each course is defined which includes lectures, tutorials, practical and assignments, as specified to individual courses.

11. COURSE PATTERN

The number of credits per semester may vary from 20 to 26, an average of 23 credits per semester and a total of around 120-153 credits for the program. Generally 1 credit per hour of instruction in theory and 1 credit for 2 hours of practical or project work or internship per week.

The courses offered in a program are divided in to core, foundation, and elective courses. The program patterned indicating hours of instruction in all semesters defined under section -3

12. THE SCHEME OF EXAMINATION

There shall be examinations at the end of each semester as per the calendar of events notified by the university.

13. INTERNAL ASSESSMENT

Regular internal assessment examinations should be conducted on each course in a semester.

There should be a minimum of at least 03 internal assessments examinations in each semester, the number of examination on each course is left to the department. An average of the best two internal assessment examinations should be taken in to consideration during calculation of marks of internal assessment.

The weightage given to the internal assessment is 20% out of the total marks assigned to the course.

Student must secure at least 35% of total marks fixed for internal assessment examination of that course to be eligible to appear for the examination

14. REGISTERING FOR THE EXAMINATIONS

Candidate to be eligible to appear for University examination, shall have undergone satisfactorily the semester of the study, shall have to obtain 75% attendance in theory and practical/tutorial jointly to become eligible to appear for examination in the subject/course, Shall secure at least 35% of internal assessment from the total marks fixed for IA in a particular subject in order to become eligible for examination, shall fulfil any other requirement that may be prescribed by the University from time to time.

And shall pass in all the courses of that semester. Such eligible students will be allotted Registration Number.

15. VALUATION OF ANSWERS SCRIPTS

Each written paper shall be valued by one internal examiner and one external examiner. Each practical examination shall be jointly conducted and evaluated by one internal examiner and one external examiner or two external examiners if there are no internal examiners. But not by two internal examiners. If the difference in marks between two valuations is more than 15% of the maximum marks, the Registrar (Evaluation) or his nominee shall check the entries and the total marks assigned by the two valuers. If there is any mistake in totalling, it shall be rectified. While checking the total, if it is observed that any one or more of the answers is not valued by one of the valuers, the Chairman, BOE shall advise internal members of the Board of Examiners to value that answer. After receiving the marks, the Chairman, BOE shall make the necessary corrections. Despite all these corrections, if the difference between the two valuations is still more than 15%, the Chairman, BOE shall arrange for third valuation by examiners from the approved panel of examiners.

In case of two valuations, the average of the two valuations and if there are three valuations, the average of the nearest two valuations shall be taken for declaring results.

16. RESULTS CLASSIFICATION OF SUCCESSFUL CANDIDATES

The results of successful candidates at the end of each semester shall be declared on the basis of Percentage of Aggregate Marks, converted to grade point and alpha – sign grade for each course on the basis of 10 point scale recommended by UGC.

The following table 1 and 2 shows the final results with grade description and grades

Table 1: Final Result/Grades Description

Semester/ Program % of marks	Semester GPA / Program CGPA	Alpha-Sign/ Letter Grade	Result/Class Description
90.0-100	9.00-10.00	O (Outstanding)	Outstanding
80.0-<90.0	8.00-<9.00	A+ (Excellent)	First Class Exemplary
70.0-<80.0	7.00-<8.00	A (Very Good)	First Class Distinction
60.0-<70.0	6.00-<7.00	B+ (Good)	First Class
55.0-<60.0	5.50-<6.00	B (Above Average)	High Second Class
50.0-<55.0	5.00-<5.50	C (Average)	Second Class
40.0-<50.0	4.00-<5.00	P (Pass)	Pass Class
Below 40	Below 4.00	F (Fail)	Fail/ Reappear
Absent	0	Ab (Absent)	

Table 2 point grading system with letter grade

Grade Point	0	0	4	5	6	7	8	9	10
Letter Grade	Ab	F	P	C	B	B+	A	A+	O
	Absent	Fail	Pass	Average	Above average	Good	Very good	Excellent	Outstanding

17. COMPUTATION OF SEMESTER GRADE POINT AVERAGE (SGPA) AND CUMULATIVE GRADE POINT AVERAGE (CGPA)

17.1 Calculation of SGPA

The following procedure to compute the Semester Grade Point Average

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 by a student, i.e

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

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

Note: Grade point denotes the decimal of percentage of marks scored

Example for SGPA (20 Credits)

Papers/courses	P1	P2	P3	P4	P5	Total
Max. marks	100	100	100	100	100	500
% Marks Obtained	77	73	58	76	64	348
Grade Points Earned (GP)	7.7	7.3	5.8	7.6	6.4	-
Credits for the Course(C)	4	4	4	4	4	20
Credit points= GP x C	31	29	23	30	26	139

Semester Aggregate Marks : $348 / 500 = 69.60 \%$

Classification of Result : First Class

Illustration for SGPA

Course /Core paper	Credit	Grade letter As per 10 point scale	Grade point As per 10 point scale	Credit point (Credit X Grade point)
Course 1	04	A	7.7	4X7.7= 31
Course 2	04	B+	7.3	4X7.3=29
Course 3	04	B	5.8	4X5.8=23
Course 4	04	O	7.6	4X7.6=30
Course 5	04	C	6.4	4X6.4=26
	20			139
	SGPA	139/20 = 6.95		

The SGPA shall then be computed by dividing the total credit points of all the courses of a semester of the study by the total credits for the semester.

$$\text{SGPA} = \text{Total credit points} / \text{Total Credits} = 139 / 20 = \mathbf{6.95}$$

Semester Alpha Sign Grade: **B**

17.2 Calculation of CGPA

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

$$\mathbf{CGPA = \Sigma(C_i \times S_i) / \Sigma C_i}$$

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

Example for CGPA

The Cumulative Grade Point Average (CGPA) at the end of the fourth semester shall be calculated as the weighted average of the semester GPW. The CGPA is obtained by dividing the total of GPW of all the four semesters by the total credits for the program.

ILLUSTRATION I

Semester	I	II	III	IV	V	VI	Total
Total Marks per Semester	500	500	500	500	500	500	3000
Total Marks Secured	348	460	466	450	400	400	2524
Semester Alpha Sign Grade	B+	O	O	O	A+	A+	-
SGPA	6.95	8.0	7.77	8.5	7.0	7.0	-
Semester total Credits	20	26	24	24	24	24	142

Aggregate Percentage of Marks = $2524 / 3000 = 84.1 \%$

Classification of Result: **Excellent (First class with exemplary)**

Illustration for CGPA

Semester 1	Semester 2	Semester 3	Semester 4	Semester 5	Semester 6
Credit 20	Credit 26	Credit 24	Credit 24	Credit 24	Credit 24
SGPA 6.95	SGPA 8.0	SGPA 7.77	SGPA 8.5	SGPA 7.0	SGPA 7.0

$$CGPA = \frac{20(6.95) + 26(8.0) + 24(7.77) + 24(8.5) + 24(7.0) + 24(7.0)}{\text{Total credits of programme 142}}$$

$$CGPA = \frac{139 + 208 + 186.5 + 204 + 168 + 168}{142} = 7.56$$

CGPA 7.56 A (very good) First class with distinction

18. TRANSCRIPT (SCORE CARD /MARKS SHEET) FORMAT

University will issue a transcript format indicating semester performance in terms of score, grade points, SGPA and CGPA. Where the SGPA and CGPA shall be rounded off to 2 decimal places and reported in the Transcripts.

19. MINIMUM FOR A PASS

A candidate shall be declared to have passed the UG, if he/she secures at least a CGPA of 4.0 (Course Alpha-Sign Grade C) in the aggregate of both internal assessment and semester end examination marks put together in each unit such as theory papers / practical / project work / dissertation / viva-voce.

However, candidate has to secure minimum of 35% marks in written theory and practical examination separately and 40% as subject aggregate to be declared as pass. Where the subject has no practical, Viva-voce, internal assessment component, passing criteria is 40%.

20. GRACE MARKS

Any student who completes all the courses in a semester, but failed in any one of the course with a shortage of 5 or less than 5 marks, such candidates will be awarded to maximum of 5 grace marks.

21. CARRY OVER PROVISION

In the first year, candidates who fail in a first semester examinations may go to the second semesters and take the examinations. But he/she has to complete the first year courses before enters to 2nd year 3rd semester. However, candidate is allowed to carry subjects of 3rd and 4th semesters to 5th semester. . But before entering for the 6th semester, he/she has to complete all the carried subjects along with 5th semester courses. However a carryover provision restricted to the maximum period offered to a candidate for completion of the program as per the clause 7.0

22. REVALUATION

There is no revaluation permissible in the regulation

23. POWER TO REMOVE DIFFICULTIES:

- i) If any difficulty arises in giving effect to the provisions of these regulations, the Vice-Chancellor may by order make such provisions not inconsistent with the Act, Statutes, Ordinances or other Regulations, as appears to be necessary or expedient to remove the difficulty.
- ii) Every order made under this rule shall be subject to ratification by the Appropriate
a) University Authorities.

PREVIEW ONLY, NOT FOR PRINTING
GRADE CARD

SEMESTER - I B.Sc. IMAGING TECHNOLOGY (C.B.C.S)
January 2018 Examination

Register Number : 17IMT001



Student Name : Abhijith K P
Father's Name : Pramod K Das
Mother's Name : Rekha Pramod

Sl. No.	Subject / Paper		Theory / Practical		I.A. / Viva		Total		Cr. Hrs.	Gr. Pts.	Cr. Pts.	Remarks
			Max.	Sec.	Max.	Sec.	Max.	Sec.				
<u>Core Course</u>												
01	Anatomy-I : General Anatomy, Histology and Embryology	Th.	050	041	025	020	075	061	004	7.6	30.4	Pass
		Pr.	020	012	005	003	025	015				
02	Anatomy-II : Systemic Histology and Gross Anatomy	Th.	050	027	025	020	075	047	004	6.3	25.2	Pass
		Pr.	020	013	005	003	025	016				
03	Physiology-I : Physiological functions of the body	Th.	050	041	025	021	075	062	004	8.5	34.0	Pass
		Pr.	020	018	005	005	025	023				
04	Physiology-II : Physiology of Hormonal and Regulatory function	Th.	050	038	025	021	075	059	004	8.0	32.0	Pass
		Pr.	020	017	005	004	025	021				
<u>Foundation Course</u>												
05	Basic Computer Applications	Th.	050	023	-	-	050	023	003	6.1	18.4	Pass
		Pr.	020	020	-	-	020	020				
<u>Discipline Specific Elective</u>												
06	Physiology (ECG)	Th.	030	028	-	-	030	028	001	9.3	09.3	Pass
Grand Total							500	375	020		149.4	
S.G.P.A : 7.47					Grade : A (Very Good)							

35% in each Theory and Practical Examination and 40% in Subject aggregate.

College / Department : Allied Health Sciences, SDUAHER



Name & Signature
of verifier

Date : 04/04/2018

Controller of Examinations

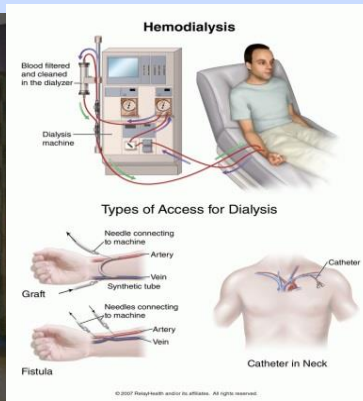
Percentage of Marks	SGPA/CGPA	Alpha-Sign/Letter Grade	Result/Class Description
90.0-100	9.00-10.00	O (Outstanding)	Outstanding
80.0-<90.0	8.00-<9.00	A+ (Excellent)	First Class Exemplary
70.0-<80.0	7.00-<8.00	A (Very Good)	First Class Distinction
60.0-<70.0	6.00-<7.00	B+ (Good)	First Class
55.0-<60.0	5.50-<6.00	B (Above Average)	High Second Class
50.0-<55.0	5.00-<5.50	C (Average)	Second Class
40.0-<50.0	4.00-<5.00	P (Pass)	Pass Class
Below 40	Below 4.00	F (Fail)	Fail/Reappear
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Deemed to be University u/s 3 of the UGC Act, 1956

BACHELOR OF SCIENCE (B.Sc.) In Renal Dialysis Technology 2016



SYLLABUS UNDER **CHOICE BASED CREDIT SYSTEM**

**SRI DEVARAJ URS ACADEMY OF HIGHER
EDUCATION AND RESEARCH
KOLAR KARNATAKA**



SDUAHER

**Adoption of Choice based credit system for
Bachelor of Science in Allied Health Science
Programme
B.Sc. Renal Dialysis Technology**

**UNDER FACULTY OF ALLIED HEALTH SCIENCES
As per University Grants Commission**

2016-17



At a glance this logo is abstract, yet it contains the vital ingredients for an institution like Sri Devaraj Urs Academy of Higher Education and Research.

The institution's medical background, humanitarian values, Compassion, approachability, social commitment and the subsequent research towards the most precious thing, the human life, is the core theme.

The graphic form of a person in the centre of a bud represents the humanity. It denotes the growing process of life and its existence. And the two hands safeguarding them show the care and a sense of security. It is also capable of holding something within the vast expanse of knowledge by the university for the people's benefit. Hence, the motto " Knowledge for Posterity" is very appropriate and gives a punch in Red. The four light blue half circles (smaller to bigger) depict the unending quest for knowledge and imparting it to a wider horizon, growing higher and higher.

And finally, the whole unit is embedded in a "D" shaped graphic template as background to give it a corporate identity.

COLORS USED:

Deep Blue: Credible, Confident and dependable. Represents Peace, tranquility, stability, harmony, trust,

security, cleanliness and loyalty.

Light Blue: For sky and water (colour scheme for 4 half circles)

Red: A dominant colour for strengths.

Green: For nature, health and generosity. It's cool quality soothes and has great healing powers.

SRI DEVARAJ URS ACADEMY OF HIGHER EDUCATION AND RESEARCH

VISION

"UNIVERSITY OF EXCELLENCE - KNOWLEDGE FOR POSTERITY"

MISSION

- To be a global center of excellence for Teaching, Training and Research in the field of Higher Education.
- To inculcate scientific temper, research attitude and social accountability amongst faculty and students.
- To promote with value based education for the overall personality development and leadership qualities to serve the humanity.

OBJECTIVES

- To provide need based infrastructure and facilities to students to become responsible professionals with social commitment and accountability.
- To implement effectively innovative programmes in teaching learning and evaluation.
- To impart scientific and socio cultural temperament among students to forge National identity and needs.
- To provide instruction and training in basic and advanced branches of learning.
- To provide facilities for research for the advancement and dissemination of knowledge.
- To undertake extra mural studies, consultancy, extension programmes and field outreach services for the development of society.
- To collaborate with other Universities, Institutions of excellence and Research Organizations within the country and outside for the purpose of teaching, training and research.
- To undertake need based activities for the betterment of socially and educationally backward society.



SRI DEVARAJ URS ACADEMY OF HIGHER EDUCATION & RESEARCH
Comprising Sri Devaraj Urs Medical College
(A-Deemed-To-Be-University)

Declared under Section 3 of UGC Act, 1956, MHRD GOI No.F.9-36/2006-U.3(A) Dt. 25th May 2007
POST BOX NO.62, TAMAKA, KOLAR-563 101, KARNATAKA, INDIA

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No: SDUAHER/KLR/ADMN/ 2063 / 2016-17

Date: 20.10.2016

NOTIFICATION

Sub: Implementation of **Choice Based Credit System** for the Undergraduate degree programs under the Faculty of Allied Health science.

- Ref: 1.UGC Guideline D.O. No F.1-1/2014 dated 12th Nov.2014
2. Proceedings of the 16th meeting of Board of studies of Health science subjects held on 25.08.2016
3. Proceedings of the committee of the Academic Council meeting held on 13.10.2016
4. Proceedings of the 41st meeting of Board of Management held on 19.10.2016

Sri Devaraj Urs Academy of Higher Education and Research after establishing a department of Allied health sciences has been offering B.Sc. courses in the Medical laboratory Technology, Imaging Technology, Operation Theater technology, Renal Dialysis Technology, Ophthalmic technology and Radiotherapy Technology. All these courses are under semester system but have not followed CBCS as recognized by University Grants Commission. However, in the light of the UGC letter referred above, the University has taken necessary steps to implement CBCS from the Academic Year 2016-17. Accordingly, the subject was placed in the meetings of the authorities of the University as cited above and the University is pleased to announce that the undergraduate courses offered in the Department of allied health Sciences shall follow Choice Based credit system with effect from the Academic year 2016-17 onwards.

By Order,

Sd/-
Registrar

Structure of B.Sc. Renal Dialysis Technology Programme under CBCS scheme

Semester	Core courses (1-17)	Discipline specific elective (DSE)	Ability enhancement Compulsory Course (AEC)	Skill enhancement courses (SEC)	Open elective (OE)	Foundation course
I	1&2.Anatomy –I & II 3&4.Physiology – I & II	DSE-1 DSE-2 DSE-3 DSE-4	-	-	-	Basic Computer Application
II	5.Biochemistry 6.Microbiology 7.Pathology	DSE-1 DSE-2 DSE-3 DSE-4 DSE-5 DSE-6	Environmental science	-	-	English communication
III	8 Applied Anatomy & Physiology Related to Dialysis Technology 9. Pharmacology Related to Dialysis Technology 10. Concept of Renal Disease and its Management			SEC-1 (SAFE-I)	-	-
IV	11. Applied Pathology & Microbiology Related to Dialysis Technology 12. Pharmacology Related to Dialysis Technology 13. Concept of Renal Disease and its Management		Constitution of India	-	-	-
V	14. Applied Dialysis Technology Paper-I 15. Applied Dialysis Technology Paper-II			SEC-2 Medical Ethics	-	-
VI	16. Applied Dialysis Technology Paper-I 17. Applied Dialysis Technology Paper-II	-	Quality control	-	-	-
VII	Internship					

SEMESTER-I

Papers

1. General Anatomy, Histology & Embryology
2. Systemic Histology & Gross anatomy
3. Physiological functions of the body
4. Physiology of hormonal and regulatory function
5. Basic Computer Application
6. Discipline specific electives (DSE)
 - a. Histology Techniques preparation of slides & stains
 - b. Museum Preparation
 - c. Electro Cardiogram (ECG)
 - d. Pulmonary Function Test (PFT)

First semester distribution of hours and credits- CBCS scheme

Subject	Paper & Code	Subjects	Theory		Practical		Tutorials		Total	
			hours	Credits	hours	Credits	hours	Credits	Hours	Credits
CC- Anatomy	Paper-I A201	General Anatomy, Histology & Embryology	30	02	30	01	30	01	90	04
	Paper –II A202	Systemic Histology & Gross anatomy	30	02	30	01	30	01	90	04
CC- Physiology	Paper-I A204	Physiological functions of the body	30	02	30	01	30	01	90	04
	Paper –II A205	Physiology of hormonal and regulatory function	30	02	30	01	30	01	90	04
CF- Compulsory foundation course	A207	Basic computer application	30	02	30	01	-	-	60	03
		Total	170	11	150	05	120	04	440	19
	A208	Discipline specific electives (DSE)	Anatomy*	1 Histology Techniques preparation of slides & stains (01 credit)						01
	A209			2 Museum preparation (01 credit)						
	A210		Physiology *	1 ECG (01 credit)						
	A211			2 Pulmonary function test (01 credit)						
				Grand Total						20

Note: Each student has to choose any one discipline specific elective (DSE) offered during first semester in the core subject.

First semester distribution of marks- CBCS scheme

Subject	Paper & code	Subject	Theory	Theory IA	Viva voce	Practical	Practical IA	Grand total	
CC-Anatomy	Paper-I A201	General Anatomy, Histology & Embryology	50	10	-	-	-	60	UNIVERSITY LEVEL EXAM
	Paper –II A202	Systemic Histology & Gross anatomy	50	10	-	-	-	60	
	A203	Anatomy common Practical	-	-	30	40	10	80	
CC-Physiology	Paper-I A204	Physiological functions of the body	50	10	-	-	-	60	
	Paper –II A205	Physiology of hormonal and regulatory function	50	10	-	-	-	60	
	A206	Physiology common Practical	-	-	30	40	10	80	
Compulsory foundation course	A207	Basic computer application	50	-	-	20	-	70	
Discipline specific electives (DSE)	A208	Histology Techniques preparation of slides & stains	30	-	-	-	-	30	
	A209	Museum preparation							
	A210	Electrocardiogram (ECG)							
	A211	Pulmonary Function Test (PFT)							
			280	40	60	100	20	500	

Note: As per the following

1. Proceedings of the 19th meeting of the board of Undergraduate and Post graduate studies in Allied Health Sciences held on 9th February 2018. (Agenda No. AHS/XIX-11/18)
2. 17th meeting of Faculty of Medicine held on 24th February 2018.
3. Proceedings of 31st meeting of Academic council held on 3rd November 2018 (Agenda No. AC/XXXI-02/18)
The two separate physiology practical with respect to physiology theory paper I & II is modified to single practical.
Similarly the two separate Anatomy practical with respect to Anatomy theory paper I & II is modified to single practical.
The decision is in effect to 2018-19 admission.

DETAILS OF THE COURSES

Core courses- Anatomy

1. General Anatomy, General Histology, General Embryology,
2. Gross Anatomy, Systemic Histology

Discipline Specific Elective – Anatomy

1. Histology Techniques preparation of slides & stains
2. Museum preparation

Core courses – Physiology

1. Physiological functions of the body
2. Physiology of hormonal and regulatory function

Discipline Specific Elective Physiology

1. Electrocardiogram (ECG)
2. Pulmonary function Tests

Ability enhancement course

-

Compulsory foundation course

1. Basic Computer Application

FIRST SEMESTER PROGRAMME STRUCTURE

Semester	Course Opted	Course Name	Credits
First Semester	Core courses- Anatomy	1. General Anatomy, General Histology, General Embryology,	04
		2. Gross Anatomy, Systemic Histology	04
	Discipline specific elective – Anatomy	1. Histology Techniques preparation of slides & stains	01
		2. Museum preparation	01
	Core courses – Physiology	1. Physiological functions of the body	04
		2. Physiology of hormonal and regulatory function	04
	Discipline specific elective Physiology	1. Electrocardiogram (ECG)	01
		2. Pulmonary function Tests	01
	Ability enhancement course	-	
	Compulsory foundation course	1. Basic Computer Application	03

SEMESTER-I
B.Sc. Allied Health Science Programmes (Medical Laboratory Technology)
Syllabus
Subject: Anatomy
Paper-I
Paper Title: (General Anatomy, General Histology, General Embryology)
Credits (Theory 02, Practical 01)

Theory lectures: 30

Unit –1

Introduction human body as a whole

08 hours

Definition of anatomy & its divisions, Terms of location, positions & planes, **Cell** & its organelles, **Basic tissues**- classification with examples, **Epithelium**- definition, classification, describe with examples, functions, **Glands**-classification, describe serous & mucous glands with examples

Unit-2

Locomotion & support

10 hours

Connective Tissue- components and classification, **Cartilages**- types with example & histology, **Bone**- classification, names of bone cells, parts of long bone, microscopy of compact bone, names of all bones, Vertebral column, Invertebral disc. **Joints**-Classification of joints with examples. **Muscular system**-structure & classification of muscular tissue. **Nervous System** Neuron, Classification of CNS,

Unit-3

Cardiovascular system

10 hours

Heart-Size, Location, Chambers, Exterior & Interior, Blood Supply Of Heart, Pericardium Systemic & Pulmonary Circulation, Branches Of Aorta, Common Carotid, Subclavian , Axillary , Brachial , Femoral and Internal Iliac artery, Portal Vein, Great Saphenous vein, Dural Venous Sinuses. **Lymphatic System** Thoracic duct Lymphoid organs- Primary & secondary, Names of regional Lymphatics, Axillary & Inguinal Lymph nodes

Unit-4

General Embryology

02 hours

Spermatogenesis & oogenesis, Ovulation, Fertilization. Placenta.

PRACTICAL

Experiments

(Credits 01 , Hours 30)

1. Histology of types of epithelium
2. Histology of serous, Mucous & mixed salivary glands
3. Histology of 3 types of cartilages,
4. Demonstration of all bones showing parts, radiographs of normal bones & joints.
5. Histology of compact bone (TS & LS)
6. Histology of skeletal (TS& LS), smooth & cardiac muscle
7. Histology of peripheral nerve
8. Demonstration of heart & vessels in the body,
9. Histology of large, medium sized arteries, & Large vein,
10. Histology of lymph node, Spleen, Tonsil & Thymus
11. Demonstration of embryology models

Syllabus
Subject: Anatomy
Paper-II
Paper Title: (Gross Anatomy, Systemic Histology)
Credits (Theory 02, Practical 01)

Theory lectures: 30

Unit –1

Gastro- Intestinal System **05 hours**

Parts of GIT, Oral Cavity(lip, tongue with histology), Tonsil, Dentition, Pharynx, Salivary glands, Waldeyer's ring, Oesophagus, Stomach, Small & large intestine, Liver, Gall Bladder, Spleen and Pancreas. Thoraco abdominal Diaphragm

Unit-2

Peritoneum 02 hours

Describe in brief Peritoneal folds

Unit-3

Respiratory System **03 hours**

Parts of Respiratory system , Nose, Nasal cavity, Larynx, Trachea, Pleura, Lungs, Broncho pulmonary Segments

Unit-4

Urinary System 03 hours

Gross Anatomy of Kidney, Ureter, Urinary bladder, male & female urethra,

Unit –5

Reproductive System **04 hours**

Male reproductive system - Testis, Vas deferens, epididymis, prostate (gross & histology)

Female reproductive system- Uterus, Fallopian tubes, ovary (gross & histology)

Mammary gland- gross

Unit –6 04 hours

Endocrine glands

Names of all endocrine glands, Pituitary gland, Thyroid gland, Parathyroid gland,Supra renal glands- (gross & Histology)

Unit –7

Neuroanatomy

04 hours

Cerebrum, Cerebellum, midbrain, pons, medulla oblongata, Spinal cord with spinal, Nerves, Meninges, Ventricles & cerebrospinal fluid, Names of basal nuclei, Blood supply of brain, Cranial nerves,

Unit-8

Sensory Organs

05 hours

Skin- Histology, Appendages of Skin **Eye-** Parts of Eye & Lacrimal Apparatus, Extra ocular muscles & nerve supply **Ear-** parts of Ear-External, Middle and inner ear and contents.

PRACTICAL

Experiments

(Credits 01 , Hours 30)

1. Demonstration of Gastro intestinal system, Histology of GIT
2. Demonstration of part of Respiratory System. Histology of lung & trachea
3. Demonstration of parts of Urinary system, Histology of kidney, Ureter, Urinary bladder
4. Demonstration of section of male & female pelvis with organs in situ, Histology of testis, Vas deferens, epididymis, prostate, Uterus, Fallopian tube, ovary
5. Demonstration of glands, Histology of pituitary Thyroid, Parathyroid, Suprarenal glands
6. Demonstration of all nerve plexus and palpable nerves in the body.
7. Demonstration of all parts of brain. Histology of Optic nerve, Cerebrum, Cerebellum, Spinal cord.
8. Histology of Thin and Thick Skin, Demonstration of eye ball, Histology of Cornea & Retina.

Reference Books - Anatomy

1. William Davis (P) understanding Human anatomy and Physiology MC Graw Hill
2. Chaurasia –A text book of Anatomy T.S Ranganathan –A text book of human Anatomy .
3. Fattana, Human anatomy Description & applied) Saunder's & C P Prism publishers, Bangalore
4. ESTER.M.Grishcimer, physiology & anatomy with practical Considerations J.P. Lippincott. Philadelphia.
5. Bhatnagar Essentials of Human Embryology –Revised Edition Orient Blackswan Pvt.Ltd.
6. B.D.Chaurasia Human anatomy CBS publishers
7. Patrick W.Tank and Thomas R Gest Atlas of anatomy Lippincot williams and Wilkins
8. Hollinshed Text book of Anatomy Harper and Row Publishers
9. Willium J Larson Human embryology 3rd edition Churchill Living stone
10. Indebir Singh. Human neuro Anatomy Jaypee brothers
- 11.Halim A Surface and Radiological Anatomy CBS publishers

SEMESTER-I
B.Sc. Allied Health Science Programmes
Syllabus
Subject: Physiology
Paper-I
Paper Title: (Physiological functions of the body)
Credits (Theory 02, Practical 01)

Theory lectures: 30

Unit –1

Blood

10 hours

Composition and functions of blood, Plasma proteins types and function, RBC- formation, function physiological variation, Anemia classification-morphological and etiological effects of anemias on the body, Blood indices –colour index, MCV, MCH, MCHC, ESR normal value PCV normal value, WBC- function, life span, normal value, Immunity, Hemoglobin-functions normal value, Types of Hemoglobin, Jaundice, Platelets morphology normal value and function, Blood groups- basis of blood grouping, clinical importance, blood banking and transfusion, Haemostasis, Definition, normal values of clotting and bleeding time mechanism disorders, Anticoagulants

Unit-2

Renal System

05 hours

Structure and function of nephron, types of nephron, classify nephrons. Steps of urine formation, define GFR, GFR normal value, factors affecting GFR. Micturition reflex. Diuretics Water diuresis and osmotic diuresis, define role of kidney in regulation of Blood pressure.

Unit-3

Digestive System

05 hours

Basic structure of Digestive system, Composition and functions of Salivary secretion, Gastric secretion, Pancreatic secretion, Intestinal secretion, Bile & Gastro-intestinal movements

Unit-4

Cardiovascular System

05 hours

List the Properties of cardiac muscle, conducting system of heart. List the events of Cardiac cycle & Heart sounds. Define Cardiac output and give normal value. Effect of exercise on heart. List the mechanism of Regulation blood pressure. Electrocardiogram-physiological basis and applications. Defined shock signs and symptoms of hypovolemic shock

Unit-5

Respiratory System

05 hours

Functional anatomy, Mechanics of normal respiration, functions of surfactants and lung function test, Lung volumes and capacities, definitions of Hypoxia, cyanosis, dyspnea, asphyxia, artificial respiration, partial pressure of oxygen and carbon dioxide in arterial and venous blood.

PRACTICAL

Experiments

(Credits 01 , Hours 30)

Hematology Experiments

1. Estimation of Hemoglobin
2. Bleeding time
3. Clotting time
4. PCV
5. ESR
6. Preparation of Peripheral smear.

Syllabus
Subject: Physiology
Paper-II
Paper Title: (Physiology of hormonal and regulatory function)
Credits (Theory 02, Practical 01)

Theory lectures: 30

Unit –1

Muscle And Nerve Physiology

02 hours

Structure and functions of a neuron and neuroglia. Transmission of nerve impulse, Structure and transmission across neuro-muscular junction, Myasthenia gravis, Types of muscle fibers, Rigor mortis

Unit-2

Endocrinology

09 hours

Definition, classification of endocrine hormones, Estimation and assessment of Hormones, function of Pituitary hormone, Thyroid hormone, Parathyroid hormone, Adrenal hormone, Pancreatic hormones. List the disease associated with hyper secretion and hypo secretion.

Unit-3

Reproductive System

05 hours

Male reproductive system: Functions of testis, list the step of Spermatogenesis & factors influencing it. **Female reproductive system:** function of ovary, Ovulation tests, define menstrual cycle, give the average duration, name the hormones influencing menstrual cycle. Physiological changes during pregnancy, Pregnancy diagnostic tests. Define contraception. Describe contraceptive methods in males and females.

Unit-4

Central Nervous System

09 hours

Organization of nervous system, define synapse, synapse receptor, action potential, list sensory nerves and sensations that carry, list the motor tracts, comment on sensation of spinal cord. Higher functions- memory learning speech, Cerebro spinal fluid formation, composition and functions. Lumbar puncture. Reflex arc, functions of cortex, cerebellum, hypothalamus, basal ganglia. Limbic system- components of anterior nervous system and action of heart.

Unit-5

Special Senses

05 hours

List the special senses and their receptor, visual pathway, Colour vision, refractive errors
Visual reflexes-pupillary and light reflex. structure of the middle ear and inner ear,
Mechanism of hearing, Pathway of taste, primary taste sensations, receptor for smell.

PRACTICAL

Experiments

(Credits 01, Hours 30)

Clinical Physiology

1. Pulse
2. Blood pressure
3. Spirometry
4. Pulmonary function tests
5. Electro Cardio Gram (ECG)
6. General physical examination

Reference Books Physiology

1. Guyton (Arthur) Text Book of Physiology. Latest Ed. Prism publishers
2. Chatterjee(CC) Human Physiology Latest Ed. Vol-1, Medical Allied Agency
3. Choudhari (Sujith K) Concise Medical Physiology Latest Ed. New Central Book,
4. Ganong (William F) Review of Medical Physiology. Latest Ed . Appleton
5. Pal G.K. Text book of Medical physiology Avichal publishing company
6. Campbell FJM Clinical physiology ELBS
7. Schmidt R.F. and Thews G Human physiology Springer verlong
8. Parvathi Pal A text book of practical physiology

SEMESTER-II

Papers

1. Elementary aspects of Biochemistry
2. Elementary Microbiology
3. Basics of General ,Systemic, Clinical, hematology and histopathological technique
4. English for Communication
5. Environmental Science
6. Discipline Specific Electives (DSE)
 - a. Basic aspects of research
 - b. Sample collection, preservation and transportation
 - c. Sterilization
 - d. disinfection
 - e. Antibiotic resistance
 - f. Phlebotomy
 - g. Museum Technology

Second semester distribution of hours and credit- CBCS scheme

Subject	Paper	Subjects	Theory		Demonstrations/ assignments		Tutorials		Total	
			hours	Credits	hours	Credits	hours	Credits	Hours	Credits
Core course (CC)	Paper-I B201	Elementary aspects of biochemistry	40	02	40	01	40	02	160	05
	Paper-II B202	Elementary microbiology.	40	02	40	01	40	02	160	05
	Paper-III B203	Basics of general ,systemic, clinical, hematology and histopathological technique	40	02	40	01	40	02	160	05
Compulsory foundation Course (FC)	B204	English for communication	30	02			-	-	30	02
Ability enhancement course (AEC)	B205	Environmental science	30	02	Field visit-	01	-	-	30	03
		Total	180	09	240	07	120	03	540	20
Discipline specific electives (DE)	B206	Biochemistry*	1 Basic aspects of research				(01) credit		01	
	B207		2 Sample collection, preservation and transportation				(01 credit)			
	B208	Microbiology*	1. Sterilization and disinfection				(01 credit)			
	B209		2. Antibiotic resistance				(01 credit)			
	B210		3. Specimen collection and transportation				(01 credit)			
	B211	Pathology*	1. Phlebotomy				(01 credit)			
B212	2. Museum Technology (01 credit)									
			Grand Total							21

Note: choose any one elective from DSE during second semester in the subject *

Second semester distribution of marks- CBCS scheme

Subject	Paper/code	Subjects	Theory				Practical			
			Theory	Viva voce	I.A	Sub total	Practical	I.A	Sub total	Grand total
CC Bio chemistry	Paper-I B201	Elementary aspects of biochemistry	80	-	20	100	-	-	-	100
CC Micro biology	Paper-II B202	Elementary microbiology.	80	-	20	100	-	-	-	100
CC Pathology	Paper-III B203	Basics of general ,systemic, clinical, hematology and histopathological technique	80	-	20	100	-	-	-	100
Compulsory foundation course (CF)	B204	English for communication	50	-	-	50		-	-	50
Ability enhancement course (AEC)	B205	Environmental science-	60-	--	20	80	--	-	-	80
Discipline specific electives (DE)	B206	1. Basic aspects of research	30	-	-	30	-	-	-	30
	Biochemistry B207	2.Sample collection, preservation and transportation								
	B208	1.Sterilization and disinfection								
	B209	2.Antibiotic resistance								
	B210	3.Specimen collection and transportation								
	B211	Phlebotomy (01 credit)								
Pathology B212	3.Museum Technology (01credit)									
		Total	380		80	460	-	-	-	460

Note: No practical examinations in semester –II Biochemistry, pathology and microbiology

DETAILS OF THE COURSES

I. CORE COURSES- BIOCHEMISTRY

1. Elementary aspects of Biochemistry.

Discipline specific elective biochemistry

1. Basics aspects of Research
2. Sample collection, preservation and transportation

II CORE COURSES – MICROBIOLOGY

1. Elementary Microbiology.

Discipline specific elective Microbiology

1. Sterilization and Disinfection
2. Antibiotic resistance
3. Specimen collection and transportation

Ability enhancement course

1. Environmental Science

Compulsory foundation course

2. English Communication

III CORE COURSES – PATHOLOGY

1. Basics of general, systemic, clinical, hematology and histopathological technique

Discipline specific elective Pathology

1. Phlebotomy (01 credit)
2. Museum Technology (01credit)

SECOND SEMESTER PROGRAMME STRUCTURE

Semester	Course Opted	Course Name	Credits
second semester	Core courses- Biochemistry	1. Elementary aspects of Biochemistry	05
	Discipline specific elective – Biochemistry	1. Basics aspects of research	01
		2. Sample collection, preservation and transportation	
	Core courses – Microbiology	1. Elementary Microbiology.	05
	Discipline specific elective Microbiology	1. Sterilization and Disinfection	01
		2. Antibiotic resistance	
		3. Specimen collection and transportation	
	Ability enhancement course	1. Environmental science	03
Compulsory foundation course	1. English communication	02	
Core courses pathology	1. Basics of general, Systemic, Clinical, hematology and histopathological technique	05	
Discipline specific elective Pathology	1. Phlebotomy (01 credit) 2. Museum Technology (01credit)	01	

Note: choose any one elective from DSE during second semester in the subject *

SEMESTER-II
B.Sc. Allied Health Science Programmes Syllabus
Subject: Biochemistry
Paper-I
Paper Title: (Elementary aspects of Biochemistry)

Credits (Theory 02, Demonstartion 01)

Theory lectures: 40

Unit –I

04hour

Laboratory hazards and its prevention

Common laboratory accidents and ways for its prevention. First Aid in the Clinical laboratory, Laboratory precautions, storage and handling of dangerous chemicals, safety measures. Conventional and SI Units

Unit-2

02

hours

Definition of Atomic weight, Molecular weight and Equivalent weight of elements and compounds

Unit-3

05 hours

Normality, Molarity, Molality – definition and preparation of solutions with examples

Unit 4

Acids and Bases

06hour

Definition. Properties, theories, Classification, examples of strong and weak acids.

Basic concepts of Acid base reaction, Ionization of water, pH- definition, Henderson's Hassel Bach's equation, its applications and measurement.

Unit-5

02hour

Indicators

Definition, concepts, mechanisms of an indicator, use and its limitations, Commonly used indicators and their pH range. Ideal pH indicators used in different titrations. Universal indicators

Unit-6:

04hour

Buffers

Definition, mechanism of action, various types of buffers with example and applications, Preparation of Buffer solutions using pH meter

Unit-7 **02hour**
Normal values and its interpretations

Unit 8 **06hour**
Biophysics
Various grades of chemicals, reagents and water. Biomedical waste management Waste disposal in the laboratory. Medico legal aspects of laboratory technicians and laboratory ethics

Unit-9 **05hour**
Specimen collection preservation and transportation-blood urine and other body fluids.

Unit 10 **04hours**
Quality control
Definition, types, IQAS and EQAS. Calculation of mean, standard deviation and percentage of coefficient of variation.

SEMESTER-II
B.Sc. Allied Health Science Programmes
Syllabus
Subject: Biochemistry
Paper-I
Paper Title: (1.Elementary aspects of biochemistry)

Demonstrations (01 credit)

Unit-1 08 hours

Introduction to laboratory apparatus

Pipettes, Types Calibration

Burettes, beakers, petri dishes, depression plates, funnels

Flask, Bottles, Measuring cylinders, test tubes, centrifuge tubes, dispensers, tripod stand, wire gauze, Bunsen burner, desiccator, stop watch (Types - reagent bottles, wash bottles, specimen bottles)

Cuvettes (Types, precautions, uses and limitations)

Maintenance of glassware and apparatus, Significance of borosilicate glass, Care and cleaning of glass ware and plastic ware, Different cleaning solution

Unit-2 12 hours

Introduction to instruments

Water bath, Oven, Incubators, Water distillation plant and water deionizers (Use, care and maintenance)

Refrigerators, Cold box, Deep freezers Reflex condenser (Use, care and maintenance)

Centrifuges (Types, Principle, procedure, RPM, Use, care and maintenance, limitations)

Laboratory balances (Types, Use, care and maintenance, procedure for weighing different chemicals)

pH meter (Principle, procedure, types of electrodes use, care, maintenance)

Unit-3 4 hour

Dilutions, Reagent dilution techniques, calculating the dilution of a solution (Preparation of 0.1 N NaCl, 1 N HCl etc.)

Unit –4 4 hour

Stock solution, working standard, saturated and super saturated solutions

Preparation of glucose, urea etc. Volumetric flask- uses, limitations in preparing standard solutions

Unit-5**4 hour**

Preparations of normal solutions Preparation of molar solutions, % solutions, v/v, w/v solutions Conversion of % solution into molar solutions
(Preparation of 1 N Na₂CO₃, 1 N NaOH, 0.1 N HCl etc)

Unit-6**02 hours**

Titration of simple acid using a base
Demo- Titration of oxalic acid using NaOH

Unit-7**02 hours**

Normal values & interpretations –
(Normal reference range)

Reference Books Biochemistry

1. Varley – Clinical chemistry
2. TEITZ – Clinical chemistry
3. Kaplan – Clinical chemistry
4. Ramakrishna(S) Prasanna(KG), Rajna ® Text book of Medical Biochemistry Latest Ed
Orient
longman Bombay
5. Vasudevan (DM) Sreekumari(S) Text book of Biochemistry for Medical students ,
LatestEdn
6. DAS (Debajyothi) Biochemistry Latest ED Academic, Publishers, Calcutta
7. Rajagopal G & Ramakrishna –Practical Biochemistry for Medical Students
oriental Blackswan Pvt. Ltd.
8. Shivarjshankara Y.M Practical Biochemistry
9. Murray R.K harpers Biochemistry Mc graw Hill
10. Pankaj Naik Biochemistry Jaypee publication..

SEMESTER-II
B.Sc. Allied Health Science Programmes Syllabus
Subject: Microbiology
Paper Title: (Elementary Microbiology)
Credits (Theory 02, Demonstration 01)

Theory lectures: 40

Unit-1

05 hour

Bacterial cell*: Anatomy, labeled diagram,

Antibiotics* : Commonly used antibiotics, target sites , misuse of antibiotics
Penicillin, Ceftriaxone, ceftazidime, ciprofloxacin, streptomycin, Erythromycin

Unit-2

06 hour

Sterilization & Disinfectants* :

- Define sterilization and disinfection
- Enumerate the different physical methods of sterilization
- Diagram of Autoclave , principle , articles to be sterilized
- Diagram of Hot Air oven, principle , articles to be sterilized
- Enumerate the commonly used chemical disinfectants & their uses.
Phenol, Aldehydes, halogens, Ethylene oxide, detergents, antiseptics
- Describe disinfection of operation theatre

Unit-3

03 hour

Infection :

Types: acute, chronic , Primary, reinfection, secondary, cross, nosocomial, iatrogenic, subclinical, latent, atypical Source and modes of transmission with examples.

Types of infectious diseases : outbreak, endemic, epidemic , pandemic,

Unit-4

02 hour

Immunity :

Antigen & its properties

Humoral immunity: classes of immunoglobulins and its biological role

Primary Immune response :

Secondary Immune response / Booster response

Vaccines:

Killed : DPT, IPV

Live : BCG, OPV, MMR

Cell mediated immunity : cells involved , biological role

Unit-5

04 hour

Hypersensitivity*

Describe the clinical picture of anaphylaxis and mechanisms of anaphylaxis with clinical importance. Contact dermatitis: mechanism with examples

Unit-6**02 hours****Bacterial infections / diseases: ***

Draw a map of human body and mark the different lesions/ diseases caused by the following bacteria :

- Mycobacterium tuberculosis
- Vibrio cholera
- Salmonella typhi
- Leptospira
- Treponema pallidum
- Coynebacterium diphtheria
- Staphylococcus ,
- Streptococcus,
- Pneumococcus
- E. coli
- Klebsiella ,
- Pseudomonas

Describe the modes of transmission, cardinal clinical manifestations & samples to be collected in the above infections

Unit-7**08 hours****Viral infections / diseases:***

Draw a map of human body and mark the different lesions/ diseases caused by the following Viruses :

- Hepatitis A, B ,C viruses ,
- Rabies ,
- HIV
- Arboviruses – Dengue , chikungunya ,
- Measles , Mumps ,
- Influenza ,
- Herpes, Chicken pox

Describe the modes of transmission , cardinal clinical manifestations & samples to be collected in the above infections

Unit-8**02 hour****Fungal infections / diseases :***

Draw a map of human body and mark the lesions / diseases caused by opportunistic fungus

- Candida,
- Cryptococcus,
- Aspergillus,
- Penicillium,
- Mucor ,
- Rhizopus

Describe the modes of transmission , cardinal clinical manifestations & samples to be collected in the above infections

Unit-9

04 hours

Parasitic infections / diseases :*

Draw a map of human body and mark the lesions / diseases caused by the following parasites :

- Entamoeba
- Plasmodium
- Leishmania
- Trichomonas,
- Giardia ,
- Helminths : Hook worm , Round worm , Pork Tape worm , Beef Tape worm, Dog Tape worm , Pin worm , Filarial worms

Describe the modes of transmission , cardinal clinical manifestations & samples to be collected in the above infections

Describe the preventive & control measures against the helminths

Unit-10

04 hours

Bio safety

Describe the standard precautions to be followed in the work place

Describe the hand hygiene technique

Describe the segregation and appropriate color coded containers for biomedical waste

Describe the post exposure prophylaxis against HIV, Hepatitis B and Rabies

Describe blood spill management

Note: * these chapters can be asked for long essay

Electives:

- Sterilization and Disinfectants
- Antibiotic Resistance
- Specimen collection and transportation

Reference Books Microbiology

1. Ananthanarayana & Panikar Text book of Medical Microbiology Universities press
2. Text book of Microbiology by C.P.Baveja
3. Chatterjee- Parasitology – Interpretation to clinical medicine.
4. Basic laboratory methods in Parasitology, 1st Ed, J.P.boros, New Delhi-199.
5. Basic laboratory procedures in clinical bacteriology 1st Ed, JP.Brothers, New Delhi.
6. Practical microbiology methods for LAB Technicians.
7. Bhatia R : Essentials of medical Microbiology Jay pee New delhi
8. Vandepitte J Basic laboratory procedures in clinical bacteriology Jay pee publications
9. Colle JG Practical Medical Microbiology USA
10. Chatterjee K D parasitology Chatterjee medical publishers

SEMESTER-II

B.Sc. Allied Health Science Programmes Syllabus

Subject: Pathology

Paper-I Paper Title: (Basics of Hematology, clinical pathology and histopathological techniques)

Credits (Theory 02, Demonstration 01)

Theory lectures 40

Unit-1

(Basics in General Pathology)

Cell injury: agents causing cell injury, cellular adaptations (hypertrophy, atrophy, hyperplasia, metaplasia) reversible and irreversible injury.

Inflammation: cardinal signs of inflammation, acute and chronic inflammation. Laboratory tests in inflammation.

Hemodynamics: edema, thromboembolism, shock

Neoplasia: definition of neoplasm, differences between benign and malignant tumors, carcinogenesis

Infections: tuberculosis, leprosy Environmental pollution

Unit-2

(Basics in systemic pathology)

Cardio vascular system (CVS): Atherosclerosis and its complication, hypertensive heart disease, Myocardial infarction.

Leucocytes: causes for leukocytosis and leucopenia, leukemia

Respiratory system; Pneumonia, Lung cancer

GIT: peptic ulcer, gastric cancer

Liver: viral hepatitis, Gall stones

Kidney: UTI Urinary stones

Breast: Fibroadenoma, breast carcinoma

CNS: meningitis

Unit –3

(Basics of hematology and blood banking)

Blood collection, hemoglobin, ESR,PT/aPTT

RBC's: Definition of anemia,iron deficiency anaemia and megaloblastic anaemia

Blood grouping and Rh typing

Unit-4

(Clinical Pathology)

Urine examinations

Collection and transport of various clinical specimens

Unit-5 (Techniques in pathology)

Basics in tissue processing, FNAC, staining techniques.

DEMONSTRATIONS

Hemoglobin estimation.

Erythrocytes sedimentation Rate (ESR)

Urine examination

H&E staining

Blood grouping

Rh typing

Reference Books Pathology

1. Culling Histopathology techniques
2. Bancroft Histopathology techniques
3. Koss – cytology
4. Winifred Greg – Diagnostic cytopathology
5. Orell – Cyto Pathology
6. Todd & Sanford Clinical Diagnosis by laboratory method
7. Dacie & Lewis – Practical Haematology
8. Ramanic Sood, Laboratory Technology (Methods and interpretation)
4th Ed. J.P. Bros, New Delhi
9. Satish Gupta Short text book of Medical Laboratory for technician J.P. Bros,
New Delhi
10. Sachdev K.N. Clinical Pathology and Bacteriology 8th Ed, J.P. Bros, New Delhi-
11. Krishna - Text book of Pathology, Orient Longman PVT Ltd.

SEMESTER-III

Papers

1. Applied Anatomy & Physiology Related to Dialysis Technology
2. Pharmacology Related to Dialysis Technology
3. Concepts of Renal Disease and its management
4. Skill Enhancement course
SAFE -i

**Third semester B.Sc. in Renal Dialysis Technology distribution of
hours and credit- CBCS scheme**

Subject	Paper	Subjects	Theory		Practical		Demonstrations/ assignments		Tutorials		Total	
			hours	Credits	hours	Credits	hours	Credits	hours	Credits	Hours	Credits
Core course (CC)	Paper-I C201	Applied Anatomy & Physiology Related to Dialysis Technology	40	02	40	01	40	1	40	02	160	06
	Paper-II C202	Pharmacology Related to Dialysis Technology	20	01	-	-	-	-	20	01	40	02
	Paper-III C203	Concepts of Renal Disease and its management	40	03	-	-	-	-	40	03	80	06
Skill enhancement course (SEC)	C204	<i>Safe -i</i>	30	03	-	-	-	-	-	-	30	03
		Total	130	09	40	01	40	01	100	06	310	17

Third semester B.Sc. in Renal Dialysis Technology distribution of marks - CBCS scheme

Subject	Paper/code	Subjects	Theory				Practical			Grand total
			Theory	Viva voce	I.A	Sub total	Practical	I.A	Sub total	
Core course (CC)	Paper-I C201	Applied Anatomy & Physiology Related to Dialysis Technology	100	30	20	150	40	10	50	200
		Section-A Applied Anatomy	50	15	10	75	20	5	25	100
		Section-B Applied Physiology	50	15	10	75	20	5	25	100
	Paper-II C202	Pharmacology Related to Dialysis Technology	40		10	50	-	-	--	50
	Paper-III C203	Concept of Renal Disease and its Management	80	-	20	100	-	-	-	100
Skill enhancement course (SEC)	C204	<i>Safe -i</i>	50	-	-	50	-	-	-	50
		Total	270	30	50	350	40	10	50	400

THIRD SEMESTER PROGRAMME STRUCTURE

Semester	Course Opted	Course Name	Credits
Third Semester	Core courses-	1. Applied Anatomy & Physiology Related to Dialysis Technology	06
		2. Pharmacology Related to Dialysis Technology	02
		3. Concept of Renal Disease and its Management	06
	Skill Enhancement course	SAFE i	03

SEMESTER-III
B.Sc. in Renal Dialysis Technology programme Syllabus
Paper 1 Subject: Applied Anatomy and Applied Physiology
(Section-A and Section B)
Credits (Theory 02, Practical 02, Demonstrations 1)

Total 40 hours

Section- A Applied Anatomy

20 hours

Unit-1

Basic anatomy of urinary system – structural anatomy of kidney, bladder, ureter, urethra, prostate

Unit-2

Histology of kidney

Unit-3

Blood supply of kidney

Unit-4

Development of kidney in brief

Unit-5

Anatomy of peritoneum including concept of abdominal hernias

Unit-6

Anatomy of vascular system

- Upper limb vessels – course, distribution, branches, origin & abnormalities
- Neck vessels – course, distribution, branches, origin & abnormalities
- Femoral vessels - course, distribution, branches, origin & abnormalities

Practical:

1. Microscopic structure of Kidney, Ureter, Urinary bladder prostate
2. Spotter & Discussion of specimens- Kidney, Ureter, Urinary Bladder, prostate, lower limb & Upper limb vessels
3. Embryology models of Development of Kidney
4. Surface marking - Aorta, Kidney, Ureter

Section B: Applied Physiology

20 hours

Unit-1

Mechanism of urine formation

Unit-2

Glomerular filtration rate (GFR)

Unit-3

Clearance studies

Unit-4

Physiological values – urea, creatinine, electrolytes, calcium, phosphorous, uric acid, magnesium, glucose
24 hours urinary indices – urea, creatinine electrolytes, calcium, magnesium

Unit-5

physiology of renal circulation factors contributing & modifying renal circulation autoregulation

Unit-6

Hormones produced by kidney & physiologic alterations in pregnancy

Unit-7

Haemostasis – coagulation cascade, coagulation factors, auto regulation, BT, CT, PT, PTT, thrombin time

Unit-8

Acid base balance – basic principles & common abnormalities like hypokalemia, hyponatremia, hyperkalemia, hypernatremia, hypocalcemia, hypercalcemia, ph, etc.

Unit-9

Basic nutrition in renal diseases

Practical

1. Red Blood Cell count
2. White Blood cell count
3. Estimation of hemoglobin
4. Packed cell volume
5. Erythrocyte sedimentation rate
6. Blood pressure
7. Blood groups

Semester-III
B.Sc. in Renal Dialysis Technology programme Syllabus
Paper II Subject: Pharmacology Related to Dialysis Technology
Credits (Theory 02, Tutorials 1)

Theory 20 hours

Unit 1: Introduction to Pharmacology	2 hours
Unit 2: IV fluid therapy with special emphasis in renal diseases	2 hours
Unit 3: Diuretics and antidiuretics Classification, Mechanism of action, Uses, Adverse effects, Contraindications	3 hours
Unit 4: Drugs used in Hypertension	4 hours
Unit 5: Drugs used in Hypotension	1 hours
Unit 6: Drugs and dialysis - Dose and duration of administration of drugs	1hours
Unit 7: Dialyzable drugs - Phenobarbitone, Lithium, Methanol, Isoniazid, Salicylates, Theophylline, Ethylene glycol and Carbamazepine	2 hours
Unit 8: Vitamin D analogues, phosphate binders,	2 hours
Unit 9: Iron, folic acid and other vitamins of therapeutic value	1 hours
Unit 10: Erythropoietin, Management of Anemia investigation, causes, types and treatment approach	2 hours

Table of specification for BSc Renal Dialysis Technology
Second Year III semester
BATCH 2016 -2017 onwards CBCS

Chapter wise distribution of types of Questions and Marks will be as below

The pattern of questions would be of three types

Chapter/Topic	Type and No. of Questions	Marks 40
Diuretics and Antidiuretics, Drugs used in Hypertension	Long Essay 1X10	10
IV fluid therapy with special emphasis in renal diseases Diuretics and Antidiuretics, Drugs used in Hypertension, Drugs used in hypotension, Drugs and dialysis - Dose and duration of administration of drugs Vitamin D analogues, phosphate binders and folic acid	Short Essay 3X5 (Answer any three)	15
IV fluid therapy with special emphasis in renal diseases Drugs used in Hypertension Dialyzable drugs - Phenobarbitone, Lithium, Methanol, Isoniazid, Salicylates, Theophylline, Ethylene glycol and Carbamazepine Vitamin D analogues, phosphate binders, Iron, folic acid and other vitamins of therapeutic value Erythropoietin and treatment of anemia	Short Answer 5X3 (Answer any five)	15

SEMESTER-III
B.Sc. in Renal Dialysis Technology programme Syllabus
Paper III Subject: Concepts of Renal Disease and its management
Credits (Theory 02, Tutorials 1)

Theory 40 hours

Clinical Manifestations, evaluation & management of the following Diseases

Unit-1

Acute renal failure

Unit-2

Nephrotic syndrome – primary & secondary

Unit-3

Nephritic syndrome

Unit-4

UTI – urinary tract infections

Unit-5

Asymptomatic urinary abnormalities

Unit-6

Chronic renal failure

Unit-7

Food pattern and its relation to health

Unit-8

Factors influencing food habits

Unit-9

Superstitions, culture, religion, income, composition of family, age, occupation, special group etc.

Unit-10

Food selection, storage and preservation

Unit-11

Prevention of food adulteration.

Reference books

1. Oxford textbook of Nephrology
2. The Kidney – Brenner (Vol I/II)
3. Diseases of the Kidney and the urinary tract – Schrier (Vol I, II, & III)
4. Textbook of Dialysis therapy – Nissenson
5. Textbook of Peritoneal Dialysis – Ram Gokal
6. Handbook of dialysis – John T. Daugirdas
7. Clinical text of Nephrology By John Fegally
8. Text book of Nephrology –Oxford and Brenner Rector (Reference only)
9. NANT and Oxford -Text books of Dialysis for technologist

SEMESTER-IV

Papers

1. Applied Pathology & Microbiology Related to Dialysis Technology
2. Pharmacology Related to Dialysis Technology
3. Concepts of Renal Disease and its management
4. Constitution of India

Forth semester: B.Sc. in Renal Dialysis Technology, distribution of hours and credit

Subject	Paper	Subjects	Theory		Practical		Demonstrations/ assignments		Tutorials		Total	
			hours	Credits	hours	Credits	hours	Credits	hours	Credits	Hours	Credits
Core course (CC)	Paper-I D201	Applied Pathology & Microbiology Related to Dialysis Technology	40	02	40	01	40	1	40	02	160	06
	Paper-II D202	Pharmacology Related to Dialysis Technology	20	01	-	-	-	-	20	01	40	02
	Paper-III D203	Concepts of Renal Disease and its management	40	02	-	-	-	-	40	02	80	04
	D204	Constitution of India	30	03	-	-	-	-	-	-	30	03
		Total	130	08	40	02	40	02	100	05	310	15

Forth semester B.Sc. in Renal Dialysis Technology, distribution of marks

Subject	Paper/code	Subjects	Theory				Practical			Grand total
			Theory	Viva voce	I.A	Sub total	Practical	I.A	Sub total	
Core course (CC)	Paper-I D201	Applied Pathology & Microbiology Related to Dialysis Technology	100	30	20	150	40	10	50	200
		Section-A Applied Pathology	50	15	10	75	20	5	25	100
		Section-B Applied Microbiology	50	15	10	75	20	5	25	100
	Paper-II D202	Pharmacology Related to Dialysis Technology	40		10	50	-	-	--	50
	Paper-III D203	Concept of Renal Disease and its Management	80	-	20	100	-	-	-	100
	D204	Constitution of India	50	-	-	50	-	-	-	50
		Total	270	30	50	350	40	10	50	400

FOURTH SEMESTER PROGRAMME STRUCTURE

Semester	Course Opted	Course Name	Credits
Fourth Semester	Core courses-	1. Applied Pathology & Microbiology Related to Dialysis Technology	06
		2. Pharmacology Related to Dialysis Technology	02
		3. Concepts of Renal Disease and its management	04
	AECC	Constitution of India	03

SEMESTER-IV
B.Sc. in Renal Dialysis Technology programme Syllabus
Paper 1 Subject: Applied Pathology and Microbiology
(Section-A and Section B)
Credits (Theory 02, Practical 02, Demonstrations 1)

Total 40 hours

Section- A Applied Pathology

20 hours

Unit-1

Congenital abnormalities of urinary system

Unit-2

Classification of renal diseases

Unit-3

Glomerular diseases – causes, types & pathology

Unit-4

Tubulointerstitial diseases

Unit-5

Renal vascular disorders

Unit-6

End stage renal diseases – causes & pathology

Unit-7

Pathology of kidney in hypertension, diabetes mellitus, pregnancy

Unit-8

Pathology of peritoneum – peritonitis – bacterial, tubular & sclerosing peritonitis dialysis induced changes

Unit-9

Pathology of urinary tract infections

Pyelonephritis & tuberculous pyelonephritis

Practical

20 hours

1. Urine Analysis- Physical Examination of Urine
2. Chemical examination of Urine-proteins, Blood chemical examination of urine-sugar and ketone bodies, bile salts and bile pigments
3. Urine microscopy

Section- A Applied Microbiology

20 hours

Unit-1

Hepatotropic viruses in detail – mode of transfusion, universal precautions, vaccinations

Congenital abnormalities of urinary system

Unit-2

Human immunodeficiency virus (hiv), mode of transfusion, universal precautions

Unit-3

Opportunistic infections

Unit-4

Microbiology of urinary tract infections

Unit-5

Microbiology of vascular access infection (femoral, jugula, subclavian catheters)

Unit-6

Sampling methodologies for culture & sensitivity

Practical

1. Introduction to Bacteria, Gram stain, Standard loop Technique
2. Kass criteria, Urine sample, antimicrobial sensitivity,
3. Disc diffusion, Broth dilution, ZN staining
4. Procedure for inserting IV Cannula
5. Maintenance of IV lines
6. Central venous catheters
7. PEP during IV Cannula insertion
8. Tips to collect specimens

SEMESTER-IV
B.Sc. in Renal Dialysis Technology programme Syllabus
Paper II Subject: Pharmacology related to Dialysis Technology
Credits (Theory 02, Practical 02, Demonstrations 1)

Total 40 hours

Paper –II Pharmacology related to Dialysis Technology

Unit 1: Anticoagulants Heparin Low Molecular Weight Heparin Warfarin	5 hours
Unit 2: Protamine sulphate	
Unit 3: Antiplatelets agents	
Unit 4: Antiseptics Formalin H ₂ O ₂ Sodium hypochlorite for hemodialysis Disinfectants	4 hours
Unit 5: Haemodialysis concentrates- composition and dilution Acetate Bicarbonate	6 hours
Unit 6: Peritoneal dialysis in particular hypertonic solutions – composition	
Unit 7: Potassium exchange resins with special emphasis on mode of administration	5 hours

Table of specification for BSc Renal Dialysis Technology
Second Year IV semester
BATCH 2016 -2017 onwards CBCS

Chapter wise distribution of types of Questions and Marks will be as below

The pattern of questions would be of three types

Chapter/Topic	Type and No. of Questions	Marks 40
Anticoagulants Heparin, Low Molecular Weight Heparin Warfarin, Protamine sulphate Hemodialysis concentrates composition and dilution – Acetate and Bicarbonate	Long Essay 1X10	10
Antiplatelets agents Antiseptics and disinfectants –Formalin, H ₂ O ₂ , Sodium hypochlorite for hemodialysis Hemodialysis concentrates composition and dilution – Acetate and Bicarbonate Peritoneal dialysis in particular hypertonic solution – composition Potassium exchange resin with special emphasis on mode of administration	Short Essay 3X5 (Answer any three)	15
Anticoagulants Heparin, Low Molecular Weight Heparin Warfarin, Protamine sulphate, Antiplatelets agents Antiseptics and disinfectants –Formalin, H ₂ O ₂ , Sodium hypochlorite for hemodialysis Peritoneal dialysis in particular hypertonic solution – composition	Short Answer 5X3 (Answer any five)	15

Internal assessment

Theory: 10 Marks

University examination

Theory: The pattern of question paper is as follows for 40 marks paper

Type of questions	Number of questions	Marks for each questions	Total
Long Essay	1 (No choice)	10	10
Short Essay	4 (Answer any three)	05	15
Short Answer Questions	6 (Answer any five)	03	15
Total Marks			40

Examination components and distribution of marks for BSc Renal Dialysis Technology Second Year III and IV semester BATCH 2016 -2017 onwards CBCS

	THEORY	
1.	Written paper No. of papers Maximum marks	One 40
2.	Internal Assessment (Theory)	10
	Total Theory	50

RECOMMENDED TEXTBOOKS

1. K.D. Tripathi. Essentials of Medical Pharmacology, 7th edition, Jaypee Brothers, New Delhi 2013
2. RS Satoskar, Nirmala Rege, SD Bhandarkar. Pharmacology and pharmacotherapeutics. 24th edition, Elsevier India Gurgaon 2015
3. Padmaja Udaykumar. Medical Pharmacology. 5rd edition CBS Publishers & Distributors Pvt. Ltd New Delhi 2017

SEMESTER-IV
B.Sc. in Renal Dialysis Technology programme Syllabus
Paper III Subject: Concepts of Renal Disease and its management
Credits (Theory 02, Practical 02, Demonstrations 1)

Total 40 hours

Unit-1

Renal stone diseases

Unit-2

Obstructive uropathies

Unit-3

Congenital & inherited renal diseases

Unit-4

Tumors of kidney

Unit-5

Pregnancy associated renal diseases

Unit-6

Renal vascular disorders & hypertension associated renal diseases

Unit-7

Classification of nutrients.

Unit-8

Macronutrients and micronutrients.

Unit-9

Types, sources, requirements and deficiency of proteins.

Unit-10

Sources, requirements and deficiency of carbohydrates.

Unit-11

Types, sources, requirements and deficiency of fats.

Unit-12

Sources, requirement and storage of drinking water.

Unit-13

Types, sources, requirements and deficiency of minerals.

Unit-14

Types, sources, requirements and deficiency of vitamins

Reference books

1. Oxford textbook of Nephrology
2. The Kidney – Brenner (Vol I/II)
3. Diseases of the Kidney and the urinary tract – Schrier (Vol I, II, & III)
4. Textbook of Dialysis therapy – Nissenson
5. Textbook of Peritoneal Dialysis – Ram Gokal
6. Handbook of dialysis – John T. Daugirdas
7. Clinical text of Nephrology By John Fegally
8. Text book of Nephrology –Oxford and Brenner Rector (Reference only)
9. NANT and Oxford -Text books of Dialysis for technologist

SEMESTER-V

Papers

1. Applied Dialysis Technology Paper-I
2. Applied Dialysis Technology Paper-II
3. Skill Enhancement course
Medical Ethics

Fifth semester B.Sc. in Renal Dialysis Technology distribution of hours and credits

Subject	Paper	Subjects	Theory		Practical		Demonstrations/ assignments		Tutorials		Total	
			hours	Credits	hours	Credits	hours	Credits	hours	Credits	Hours	Credits
Core course (CC)	Paper-I E201	Applied Dialysis Technology Paper-I	40	02	40	01	40	1	40	02	160	06
	Paper-II E202	Applied Dialysis Technology Paper-II	40	02	40	01	40	1	40	02	160	06
Skill enhancement course (SEC)	E203	Medical Ethics	30	02	-	-	-	-	-	-	30	02
		Total	110	06	80	02	80	02	80	04	350	14

B.Sc. in Renal Dialysis Technology Fifth semester distribution of marks - CBCS scheme

Subject	Paper/code	Subjects	Theory				Practical			Grand total
			Theory	Viva voce	I.A	Sub total	Practical	I.A	Sub total	
Core course (CC)	Paper-I E201	Applied Dialysis Technology Paper-I	100	30	20	150	40	10	50	200
	Paper-II E202	Applied Dialysis Technology Paper-II	100	30	20	150	40	10	50	200
Skill enhancement course (SEC)	E203	Medical Ethics	50	-	-	50	-	-	-	50
		Total	250	60	40	350	80	20	100	450

Note: Conduct both the practical on same day

FIFTH SEMESTER PROGRAMME STRUCTURE

Semester	Course Opted	Course Name	Credits
Fifth Semester	Core courses-	1. Applied Dialysis Technology Paper-I	06
		2. Applied Dialysis Technology Paper-II	06
	Skill enhancement course (SEC)	Medical Ethics	02

SEMESTER-V
B.Sc. in Renal Dialysis Technology programme Syllabus
Paper I Subject: Applied Dialysis Technology
Credits (Theory 02, Practical 02, Demonstrations 1)

Total 40 hours

Paper –I APPLIED DIALYSIS TECHNOLOGY

Unit-1

Indications of dialysis

Unit-2

History & types of dialysis

Unit-3

Theory of haemodialysis – diffusion, osmosis, ultrafiltration& solvent drag

Unit-4

Haemodialysis apparatus – types of dialyser& membrane, dialysate

Unit-5

Physiology of peritoneal dialysis

Unit-6

Vascular access for haemodialysis& associated complications

Unit-7

Peritoneal access devices – types of catheter, insertion techniques & associated complications

SEMESTER-V
B.Sc in Renal Dialysis Technology programme Syllabus
Paper II Subject: Applied Dialysis Technology
Credits (Theory 02, Practical 02, Demonstrations 1)

Total 40 hours

Paper –II APPLIED DIALYSIS TECHNOLOGY

Unit-1

Dialysis in special situations

- Patients with congestive cardiac failure
- Advanced liver disease
- Patients positive for hiv, hbsag&hcv
- Failed transplant
- Poisoning cases
- Pregnancy

Unit-2

Dialysis in infants & children

Unit-3

Dialyser reuse

Unit-4

Special dialysis procedures

- Continuous therapies in haemodialysis
- Different modalities of peritoneal dialysis
- Haemodiafiltration
- Haemoperfusion
- Sled
- Mars

Unit-5

Plasmapheresis

SEMESTER-VI

Papers

1. Applied Dialysis Technology Paper-I
2. Applied Dialysis Technology Paper-II
3. Skill Enhancement course
Quality control

Sixth semester B.Sc. in Renal Dialysis Technology distribution of hours and credits

Subject	Paper	Subjects	Theory		Practical		Demonstrations/ assignments		Tutorials		Total	
			hours	Credits	hours	Credits	hours	Credits	hours	Credits	Hours	Credits
Core course (CC)	Paper-I F201	Applied Dialysis Technology Paper-I	40	02	40	01	40	1	40	02	160	06
	Paper-II F202	Applied Dialysis Technology Paper-II	40	02	40	01	40	1	40	02	160	06
Ability enhancement compulsory course	F203	Quality control	30	02	-	-	-	-	-	-	30	02
		Total	110	06	80	02	80	02	80	04	350	14

B.Sc. in Renal Dialysis Technology Sixth semester distribution of marks - CBCS scheme

Subject	Paper/code	Subjects	Theory				Practical			Grand total
			Theory	Viva voce	I.A	Sub total	Practical	I.A	Sub total	
Core course (CC)	Paper-I F201	Applied Dialysis Technology Paper-I	100	30	20	150	40	10	50	200
	Paper-II F202	Applied Dialysis Technology Paper-II	100	30	20	150	40	10	50	200
Ability enhancement compulsory course	F203	Quality control	50	-	-	50	-	-	-	50
		Total	250	60	40	350	80	20	100	450

SIXTH SEMESTER PROGRAMME STRUCTURE

Semester	Course Opted	Course Name	Credits
Sixth Semester	Core courses-	1. Applied Dialysis Technology Paper-I	06
		2. Applied Dialysis Technology Paper-II	06
	Ability enhancement compulsory course (AECC)	Quality control	02

SEMESTER-VI
B.Sc. in Renal Dialysis Technology programme Syllabus
Paper I Subject: Applied Dialysis Technology
Credits (Theory 02, Practical 02, Demonstrations 1)

Total 40 hours

Paper –I APPLIED DIALYSIS TECHNOLOGY

Unit-1

Dialysis machines - mechanism of functioning & management haemodialysis machine peritoneal dialysis machine

Unit-2

Complications of dialysis Hemodialysis – acute & long term complications peritoneal dialysis – mechanical & metabolic complications

Unit-3

Biochemical investigations required for renal dialysis

Unit-4

Adequacy of dialysis
Haemodialysis
Peritoneal dialysis
Peritoneal equilibration test (pet)

Unit-5

Anti coagulation

Unit-6

Peritonitis & exit site infection

Unit-7

Withdrawal of dialysis criteria
acute dialysis
chronic dialysis

SEMESTER-VI
B.Sc. in Renal Dialysis Technology programme Syllabus
Paper II Subject: Applied Dialysis Technology
Credits (Theory 02, Practical 02, Demonstrations 1)

Total 40 hours

Paper –II APPLIED DIALYSIS TECHNOLOGY

Unit-1

Special problems in dialysis patients
psychology & rehabilitation
diabetes
hypertension
infections
bone diseases
aluminium toxicity

Unit-2

Recent advances in haemodialysis
nocturnal dialysis
online dialysis
daily diaysis

Unit-3

Telemedicine in dialysis practice

Unit-4

Water treatment system

Unit-5

RSenalanaemia management chronic dialysis

Distribution of Type, Number and marks of Questions for Various Subjects

THEORY

Subjects having maximum marks = 100			Total
Type of question	Number of questions	Marks for Each question	
Essay type	02 (no choice)	10	20
Short essay type	12 (Answer any 10)	5	50
Short answer type	12 (Answer any 10)	3	30

Subjects having maximum marks = 80			Total
Type of question	Number of questions	Marks for Each question	
Essay type	02 (no choice)	10	20
Short essay type	8 (Answer any 6)	5	30
Short answer type	12 (Answer any 10)	3	30

Subjects having maximum marks = 50			Total
Type of question	Number of questions	Marks for Each question	
Essay type	02 (no choice)	10	20
Short essay type	5 (Answer any 3)	5	15
Short answer type	7 (Answer any 5)	3	15

Subjects having maximum marks = 40			Total
Type of question	Number of questions	Marks for Each question	
Essay type	01	10	10
Short essay type	4 (Answer any 3)	5	15
Short answer type	6 (Answer any 5)	3	15

-End-