RAMAIAH UNIVERSITY OF APPLIED SCIENCES

Programme Structure and Course Details of Bachelor (Hons) Dialysis Therapy Technology 2022-2026

Programme Code: 402

Registrar
M.S. Ramaiah University of Applied Sciences
Bangalore - 560 054

Faculty of Life and Allied Health Sciences
Department of Allied Health Sciences

DEAN
Faculty of Life & Allied Health Sciences
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Bangalore - 560 054

Dean - Academics
M.S. Ramaiah University of Applied Sciences
Bangalore - 560 054

Approved by the Academic Council at its 26th meeting held on 14 July 2022

University's Vision, Mission and Objectives

The M. S. Ramaiah University of Applied Sciences (MSRUAS) will focus on student-centric professional education and motivates its staff and students to contribute significantly to the growth of technology, science, economy and society through their imaginative, creative and innovative pursuits. Hence, the University has articulated the following vision and objectives.

Vision

MSRUAS aspires to be the premier university of choice in Asia for student-centric professional education and services with a strong focus on applied research whilst maintaining the highest academic and ethical standards in a creative and innovative environment.

Mission

Our purpose is the creation and dissemination of knowledge. We are committed to creativity, innovation and excellence in our teaching and research. We value integrity, quality and teamwork in all our endeavors. We inspire critical thinking, personal development and a passion for lifelong learning. We serve the technical, scientific and economic needs of our society.

Objectives

1. To disseminate knowledge and skills through instructions, teaching, training, seminars, workshops and symposia in Engineering and Technology, Art and Design, Management and Commerce, Health and Allied Sciences, Physical and Life Sciences, Arts, Humanities and Social Sciences to equip students and scholars to meet the needs of industries, business and society
2. To generate knowledge through research in Engineering and Technology, Art and Design, Management and Commerce, Health and Allied Sciences, Physical and Life Sciences, Arts, Humanities and Social Sciences to meet the challenges that arise in industry, business and society
3. To promote health, human well-being and provide holistic healthcare
4. To provide technical and scientific solutions to real life problems posed by industry, business and society in Engineering and Technology, Art and Design, Management and Commerce, Health and Allied Sciences, Physical and Life Sciences, Arts, Humanities and Social Sciences
5. To instill the spirit of entrepreneurship in our youth to help create more career opportunities in the society by incubating and nurturing technology product ideas and supporting technology-backed business
6. To identify and nurture leadership skills in students and help in the development of our future leaders to enrich the society we live in
7. To develop partnership with universities, industries, businesses, research establishments, NGOs, international organizations, governmental organizations in India and abroad to enrich the experiences of faculties and students through research and developmental programmes

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Programme Specifications: B.Sc. (Hons) –Dialysis Therapy Technology

Faculty	Faculty of Life and Allied Health Sciences (FLAHS)
Department	Allied Health Sciences
Programme Code	402
Programme Name	B.Sc. (Hons) –Dialysis Therapy Technology
Dean of the Faculty	Dr Krishnamurthy Jayanna
Head of the Department	Dr. Tushar Shaw

1. **Title of the Award:** B.Sc. (Hons) –Dialysis Therapy Technology

2. **Mode of Study:** Full-Time
3. **Awarding Institution/Body:** M.S. Ramaiah University of Applied Sciences, Bangalore (India)
4. **Joint Award:** --
5. **Teaching Institution:** Faculty of Life and Allied Health Sciences
   M.S. Ramaiah University of Applied Sciences, Bangalore (India)
6. **Date of Programme Specifications:** July 2022
7. **Date of Programme Approval by the Academic Council of MSRUAS :** July 2022
8. **Next Review Date:** June 2026
9. **Programme Approving Regulatory Body and Date of Approval--**
10. **Programme Accrediting Body and Date of Accreditation--**
11. **Grade Awarded by the Accreditation Body--**
12. **Programme Accreditation Validity--**
13. **Programme Benchmark**
14. **Background and Details of the Programme**

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14.1 Background and Need

Advances in science and technology have made a paradigm shift in health care over the past decade resulting in a wider appreciation of the fact that health service delivery should go beyond just physicians and nurses and involve teamwork among clinicians and non-clinicians or allied health professionals. India is fast emerging into a global medical tourism hub with an international patient base growing in double digits every year. This rising trend has resulted in an increase in investment by health care providers installing best in class equipment, upgrading medical technology, and quality accreditation. In the current scenario physician's dependent on sophisticated machinery and technology to arrive at an appropriate diagnosis. Allied healthcare professionals(AHPs) who can handle these equipment's form an indispensable member of the team for successful management of patients.

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Dialysis therapy technologists play a major role in patient care, patient education and patient compliance with the acquisition of necessary clinicalskills and technical knowledge to perform dialysis successfully. With an increase in the incidence of diabetes-related to life style modifications, the patient population requiring dialysis has increased exponentially. Dialysis treatment has been viewed as a life-sustaining therapy that aims to extend survival and improve the quality of life.

To cater to this increased demand, dialysis centers have been established at various health care delivery levels. There is an acute shortage of well-trained competent dialysis therapy technologists who can maintain and operate the machines and educate the patients. While the damaged kidneys are under treatment or when a person is waiting for kidney transplantation. Dialysis is a lifesaving therapy it will replace the kidney function. Majority of these patients may not fully comprehend the medical information, and may not be able to communicate effectively with healthcare providers, understanding of the functioning of the body during health and disease is particularly important for kidney patients undergoing dialysis. These patients need to attend treatment sessions regularly and on time, follow dietary and fluid restrictions, and adhereto complex medication regimens, all of which requires appropriate communication and building of rapport with patients.

This innovative competency-based curriculum is adopted from the guidelines published by Ministry of Health and Family Welfare, allied health Section 2015- 2016. A competency-based program focuses on blend of skills and knowledge based on the needs of the community. The main competencies that have been identified as essential in an allied health care professional are clinicalknowledge, patient care and communication approaches, which are then developed to teach relevant content across a range of courses and settings. The curriculum is outcome based and focuses on required theoretical concepts and practical skills in the domain. By undergoing this programme, students developcritical, analytical thinking and problem-solving abilities for a smooth transitionfrom academic to real-life work environment. Students do one year internship in the hospitals for skill development to work in a team to enhance practical skills and problem-solving abilities. The students are required to submit a well written project report as partial fulfilment for the award of the degree, which will help develop skills of documenting scientific work. In addition, students aretrained in communication skills and interdisciplinary topics to enhance their scope. The various new features such as foundation courses, early clinical exposure, bioengineering courses, major specialization, open electives and one year of internship make the students more versatile generating wide range of opportunities including registering for Masters in dialysis e therapy technology. Advanced teaching and learning resources, and experience of the faculty members with their strong connections with health care industry and research organizations makes this programme unique. For global mobility and acceptability of the graduates, the current curriculum structure is divided into smaller sections with focus on hours of studying that are converted into credit hours as per the international normsfollowed by various countries Integrated structure of the curriculum This competency based curriculum follows horizontal and vertical integration between disciplines; and bridges the gaps between both theory and practice, and between hospital-based practice and community practice.

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15. Programme Mission

The purpose of the programme is creation of knowledgeable human resources to work in government, semi-government, private and public sector owned hospitals and health care organizations and also to assume administrative positions. With further progression in education, graduates should be able to undertake teaching and research in colleges and universities as well asin scientific organizations.

16. Graduate Attributes

The courses have been designed with a focus on performance-based outcomes pertaining to Medical Radiology and Imaging Technology. The learning goals and objectives of the undergraduate education program is based on the performance expectations. They are articulated as learning goals(why we teach this) and learning objectives (what the students will learn). Using the framework, students will learn to integrate their knowledge, skills and abilities in a hands-on manner in a professional healthcare setting. The learning goals are divided into nine key areas,

1. Clinical care
2. Communication
3. Member of a multidisciplinary health care team
4. Ethics and accountability at all levels (clinical, professional, personal and social)
5. Commitment to professional excellence
6. Leadership and mentorship
7. Social accountability and responsibility
8. Scientific attitude
9. Lifelong learning

The aim of the curriculum is to produce Dialysis Technologists who are:

1. Technically and clinically competent
2. Aware of safety issues and the importance of patient care
3. Understand the theoretical basis for evidence-based practice
4. Effective members of the multidisciplinary team

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17. Programme Goal:

The programme acts as a specialized course and helps to develop critical, analytical and problem solving skills at first level. This foundation degree makes the graduates employable in health care organizations and also to assume administrative positions in various types of organizations. The students can progress to pursue a career in academics or health care industry or as a researcher.

16. Programme Outcomes (PO's)

The courses have been designed with a focus on performance-based outcomes pertaining to specialty. The learning goals and objectives of the undergraduate education program is based on the performance expectations. They are articulated as learning goals (why we teach this) and learning objectives (what the students will learn). Using the framework, students will learn to integrate their knowledge, skills and abilities in a hands-on manner in a professional healthcare setting. These learning goals are divided into nine key areas, though the degree of required involvement may differ across various specialties:

At the completion of this program, the student should be able to:

PO-1. Clinical care: Appraise on the evidence-based practice in dialysis therapy technology appropriate care regime

PO-2. Communication: Discuss the diagnosis and justify the options with the patient, and negotiate appropriate treatment plans in a sensitive manner thatis in the patient and society's best interests

PO-3. Membership of a multidisciplinary heath team: Discuss and communicate with and summarize relevant information to, other stakeholders including members of the healthcare team

PO-4. Ethics and accountability at all levels: Describe and apply the basic concepts of clinical ethics to actual cases and situations

PO-5. Commitment to professional excellence: Demonstrate respect for each patients' individual rights of autonomy, privacy, and confidentiality

PO-6. Leadership and mentorship: Develop leadership in quality improvement and dialysis service delivery to enhance the wellbeing of thesociety and enriched healthcare experience

PO-7. Social accountability and responsibility: Assess the patient care determinants at the local, regional and national level and build care modality asper the requirement

PO-8. Lifelong learning: Evaluate the need and prioritize lifelonglearning as an important outcome across the professional career

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17. Programme Education Objectives

PEO-1. Provide students with a strong foundation in dialysis therapy technology, to enable them to devise and deliver effective solutions to the challenging problems

PEO-2. Impart technical skills required to develop innovative solutions as perthe industry and societal requirements in the field of dialysis therapy technology.

PEO-3. Impart the required managerial and entrepreneurial skills to enable students to contribute to the patient care needs of the society
PEO-4. Instil human values, social, interpersonal and leadership skills required for professional success in evolving as global professionals.

18. Programme Specific Outcomes (POs) for B.Sc. (Hons) –Dialysis Therapy TechnologyProgram

At the end of the B.Sc. (Hons) –Dialysis Therapy Technology Programme, the graduate will be able to:

PSO-1. Apply knowledge and skills of renal replacement therapy to providesafe and effective care to the patients for achieving professional excellence.

PSO-2. Adapt to technological advancement in instrumentation and diagnostics by upgrading to the latest practices in the field of dialysis therapytechnology.

PSO-3. Demonstrate the leadership qualities and strive for the betterment oforganization, environment, and society

PSO-4. Demonstrate an understanding of the importance of life-long learning through professional development, practical training, and specializedcertifications

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19. Programme Structure:

B.Sc. (Hons) –Dialysis Therapy Technology Program

The following are the courses a student is required to successfully complete for the award of B.Sc. (Hons) –Dialysis Therapy Technology degree. The programme is delivered asper the time-table.

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SEMESTER-I

S. No.	Code	Course Title	Theory (h/W/S)	Tutorial (h/W/S)	Practical (h/W/S)	Total Credits	Max. Marks
1	AHD101A	General Anatomy	2	0	2	**3**	100
2	AHD102A	General Physiology	2	0	2	**3**	100
3	AHD103A	Health Care Delivery System	2	0	0	**2**	50
4	AHD104A	General Microbiology	2	0	2	**3**	100
5	AHN101A	Language – 1 (1)	3	0	0	**3**	100
6	AHM101A	Digital Fluency/Basic Algorithm and Programming	1	0	2	**2**	50
7	AHD106A	Basic Electrical and Electronics	2	0	2	**3**	100
8	AHD105A	Applied Physics	2	0	2	3	100
Total			**16**	**0**	**12**	**22**	**700**
Total number of contact hours per week				**28 hours per week**			

SEMESTER-II

S. No.	Code	Course Title	Theory (h/W/S)	Tutorial (h/W/S)	Practical (h/W/S)	Total Credits	Max. Marks
1	AHD107A	General Biochemistry	2	0	0	2	50
2	AHD108A	General Pharmacology	2	0	0	2	50
3	AHD109A	Concepts of hospital infection prevention	2	0	0	2	50
4	AHD110A	General Pathology	2	0	2	3	100
5	AHM113A	Health & wellness	0	0	2	2	50
6	AHD111A	Environmental studies and Health	2	0	0	2	50
7	AHD112A	Directed Clinical Education-1	0	0	20	10	100
Total			**10**	**0**	24	**23**	**450**
Total number of contact hours per week				**34 hours per week**			

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SEMESTER-III

S. No.	Code	Course Title	Theory (h/W/S)	Tutorial (h/W/S)	Practical (h/W/S)	Total Credits	Max. Marks
1	DTC201A	Basic concepts in renal diseases	3	0	0	**3**	100
2	DTC202A	Applied Pharmacology related to dialysis	2	0	0	**2**	50
3	AHN202A	Language – 2	3	0	0	3	100
4		Open Electives -1	2	0	0	2	50
5	AHM203A	SEC-2 Artificial Intelligence	1	0	2	2	50
6	AHM204A	Entrepreneurship	1	0	2	3	100
7	DTC203A	Directed Clinical Education-2	0	0	16	**8**	100
Total			**12**	**0**	**20**	**23**	**550**
Total number of contact hours per week				**32 hours per week**			

SEMESTER-IV

S. No.	Code	Course Title	Theory (h/W/S)	Tutorial (h/W/S)	Practical (h/W/S)	Total Credits	Max. Marks
1	DTC204A	Techniques in Haemodialysis (T+P)	2	1	2	**4**	100
2	DTC205A	Investigations in Renal Diseases	2	0	0	**2**	50
3		Open Elective – 2	2	0	0	2	100
4	AHN203A	Constitution of India	2	0	0	2	50
5	AHN204A	Professional communication	1	0	2	2	50
6	AHN307A	Ethics and self-awareness	1	0	2	1	50
7	AHN206A	NCC/NSS/R&R(S&G)/ Cultural	0	0	2	1	50
8	DTC206A	Studentship (Directed Clinical Education) 2	0	0	20	10	100
Total			9	1	28	24	550
Total number of contact hours per week				**38 hours per week**			

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SEMESTER-V

S. No.	Code	Course Title	Theory (h/W/S)	Tutorial (h/W/S)	Practical (h/W/S)	Total Credits	Max. Marks
1	DTC301A	Techniques in Peritoneal Dialysis(T+P)	2	1	2	4	100
2	DTC302A	Clinical practice guidelines in dialysis	2	0	0	2	50
3	DTC303A	Nutrition in Renal Disease	2	0	0	2	50
4	DTC304A	Studentship (Directed Clinical Education) 3	0	0	20	10	100
6	AHN205A	Sports/Yoga	0	0	2	1	50
5	AHN306A	SEC-3: Cyber Security	1	0	2	2	50
6	AHM305A	Project Management	2	0	2	2	50
Total			10	1	28	23	450
Total number of contact hours per week				**39 hours per week**			

SEMESTER-VI

S. No.	Code	Course Title	Theory (h/W/S)	Tutorial (h/W/S)	Practical (h/W/S)	Total Credits	Max. Marks
1	DTC305A	Extracorporeal Therapies other than Haemodialysis (T+P)	2	0	2	**3**	100
2	DTC306A	Paediatric Dialysis and transplantation(T)	2	0	2	**3**	100
3	DTC307A	Studentship (Directed Clinical Education) 4	0	0	24	12	100
4	AHN308A	Research Methodology& Biostatistics	0	0	2	3	50
5	DTC308A	SEC-4: Personality Development and Soft Skill	1	0	2	2	50
Total			5	0	32	23	400
Total number of contact hours per week				**37 hours per week**			

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SEMESTER-VII

S. No.	Code	Course Title	Theory (h/W/S)	Tutorial (h/W/S)	Practical (h/W/S)	Total Credits	Max. Marks
1	DTP401A	Research project	0	0	20	10	100
2	DTI401A	Internship	0	0	20	10	100
Total			0	0	40	20	200

SEMESTER-VIII

S. No.	Code	Course Title	Theory (h/W/S)	Tutorial (h/W/S)	Practical (h/W/S)	Total Credits	Max. Marks
1	DTP402A	Research project	0	0	20	10	100
2	DTI402A	Internship	0	0	20	10	100
Total			0	0	40	20	200

Maximum Marks		**3300 (500+450+550+550+450+400+200+200)**
Total Credits		**173 (16+23+23+24+24+23+20+20)**

Note: The Vacations and other activities shall be as per the Time-Table for the corresponding batch.

Open Elective Courses: A number of open elective courses from Faculty of Mathematical and Physical Sciences, Engineering, Management and Commerce, Art and Design, Hospitality Management and Catering Technology, Pharmacy, Dental Sciences will be announced one semester prior to the scheduled semester. The students can also register through online mode via digital platforms such as NPTEL, swayam, Coursera etc., as per the regulations.

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Sl.No.	Course Type	Credit
1	Major Discipline Core course	139
2.	Discipline Specific Elective/ Open Elective Courses	09
3	Ability Enhancement compulsory courses	28
4	Skill Enhancement courses	22
	Total Credits	**198**

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20. Programme Delivery Structure

The programme is delivered on weekdays from Monday to Saturday as per the Time-Table.

21. Teaching and Learning Methods

With a focus on self-directed learning, the curriculum will include a foundation course that focuses on communication, basic computer skills, professionalism, ethics and law. It also incorporates early clinical exposure and directed clinical education during specialty training.It is envisaged that the AHPs should have sufficient clinical exposure integrated with the learning of basic and laboratory sciences. There is an emphasis on the introduction of case scenarios for classroom discussion/case-based learning.

It is well documented in the literature that teaching and learning of clinical skills occur at the patient's bedside or other clinical areas supplemented by didactic teaching in classroomsand lecture theatres. Our institute has instituted clinical skill centers, laboratories and high- fidelity simulation laboratories to enhance the practice and training for allied and healthcarestudents and professionals. The skills training center overcomes the shortcoming of patientsbeing used to learn and practice the necessary skills. The use of simulators addresses many issues such as lack of confidence and inadequate skills in handling the equipment. Practice on simulators and with corrective measures students can hone the skills and gain confidenceto perform in real life situations.

The course delivery comprises of combination of few or all of the following methods:

1. Face to face lectures using audio-visuals
2. Workshops-group discussions, debates, presentations
3. Demonstrations
4. Guest lectures
5. Laboratory-work/Field work/Workshop
6. Hospital postings
7. Seminars
8. Group Exercises
9. Project Work

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22. Assessment and Grading (Subject to endorsement of revised unified academic regulations for 2022-23- report submitted)

22.1 Components of Grading

There shall be **two components** of grading in the assessment of each course:

Component 1, Continuous Evaluation (CE): This component involves multiple subcomponents (SC1, SC2, etc.) of learning and experiential assessment. The assessment of the subcomponents of CE is conducted during the semester at regular intervals. This subcomponent represents the formative assessment of students' learning.

Component 2, Semester-end Examination (SEE): This component represents the summative assessment carried out in the form an examination conducted at the end of the semester.

Marks obtained CE and SEE components have 60:40 weightage (CE: 60% and SEE: 40%) in determining the final marks obtained by a student in a Course.

The complete details of Grading are given in the Academic Regulations.

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22.2 Continuous Evaluation Policies

Continuous evaluation depends on the type of the course as discussed below:

22.1.1 Theory Courses

For Theory Courses Only			
Focus of COs on each Component or Subcomponent of Evaluation			
	Component 1: CE (60% Weightage)		Component 2: SEE (40% Weightage)
Subcomponent Type ▶	Terms Tests	Assignments	
CO-1			
CO-2			
CO-3			
CO-4			
CO-5			
CO-6			
The details of number of tests and assignments to be conducted are presented in the Academic Regulations and Programme Specifications Document.			

- CE components should have a mix of term tests, quiz and assignments
- Two Tests (15 each), Two Assignments (20 marks). (One written and another to be MCQs)
- Course leaders to declare the assessment components before the commencement of the session and get approval from HOD and Dean

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22.1.2 Laboratory Course

For a laboratory course, the scheme for determining the CE marks is as under:

For Laboratory Courses Only			
Focus of COs on each Component or Subcomponent of Evaluation			
	Component 1: CE (60% Weightage)		Component 2: SEE (40% Weightage)
Subcomponent Type ▶	Conduct of Experiments	Laboratory Report + Viva	Laboratory SEE
CO-1			
CO-2			
CO-3			
CO-4			
CO-5			
CO-6			
The details of number of tests and assignments to be conducted are presented in the Academic Regulations and Programme Specifications Document			

The subcomponents can be of any of the following types:

- Laboratory / Clinical Work Record
- Experiments
- Computer Simulations
- Creative Submission
- Virtual Labs
- Viva / Oral Exam
- Lab Manual Report
- Any other (e.g. combinations)

Course leaders to declare the assessment components before the commencement of the session and get approval from HoD and Dean

22.1.3 Course Having a Combination of Theory and Laboratory

For a course that contains the combination of theory and laboratory sessions, the scheme for determining the CE marks is as under:

For Combined Courses (Theory + Laboratory)					
Focus of COs on each Component or Subcomponent of Evaluation					
Course Outcome	CE (Weightage: 60 %) Four components including one Lab component			SEE (Weightage: 25 %)	Lab (Weightage:15 %)
	Tests (30 %)	Written Assignments+Lab (20 %)	Assignment +Lab CE (10%)	Written exam	LSEE : SEE
CO-1					
CO-2					
CO-3					
CO-4					
CO-5					

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CO-6					
The details of number of tests and assignments to be conducted are presented in the Academic Regulations and Programme Specifications Document.					

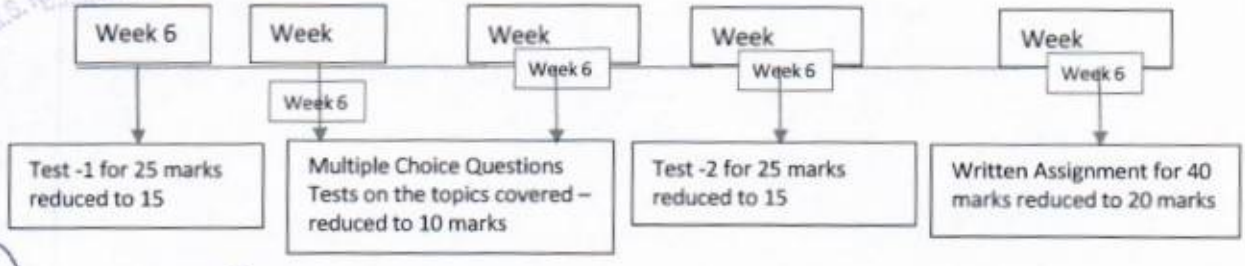
- CE components should have a mix of term tests, quiz and assignments
- Two Tests (15 each), Two Assignments (20 marks). (One written and another to be MCQs)
- In case of courses where laboratory is combined with theory, laboratory components to be assessed in both CE and SEE
- Course leaders to declare the assessment components before the commencement of the session and get approval from HoD and Dean

22.1.4 Ability Enhancement courses

For AECC Only		
Focus of COs on each Component or Subcomponent of Evaluation		
Subcomponent Type ▶	Component 1: CE (60% Weightage) Terms Tests or Assignments	Component 2: SEE (40% Weightage)
CO-1		
CO-2		
CO-3		
CO-4		
CO-5		
CO-6		
The details of number of tests and assignments to be conducted are presented in the Academic Regulations and Programme Specifications Document.		

- Course leaders to declare the assessment components before the commencement of the session and get approval from HoD and Dean

Schedule of CE Components in a Semester



SEE

- **For Non –NEP SEE for 100 marks reduced to 40 marks**
- **For NEP Programmes - SEE for 50 marks reduced to 40**

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After all the subcomponents are evaluated, the CE component marks are consolidated to attain 60% Weightage.The Semester End Examination shall be a 90 minutes theory paper of 50 marks with a weightage of 40% in case of theory courses. In summary, the ratio of Formative (Continuous Evaluation-CE) Vs Summative (Semester End Examination-SEE) should be 60:40.

23. Student Support for Learning

1. Course Notes
2. Reference Books in the Library
3. Magazines and Journals
4. Internet Facility
5. Computing Facility
6. Laboratory Facility
7. Staff Support

24. Quality Control Measures

1. Review of Course Notes
2. Review of Question Papers and Assignment Questions
3. Student Feedback
4. Moderation of Assessed Work
5. Opportunities for students to see their assessed work
6. Review by external examiners and external examiners reports
7. Staff Student Consultative Committee meetings
8. Student exit feedback
9. Subject Assessment Board (SAB)
8. Programme Assessment Board (PAB)

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25. Curricular Map

Sem	Course Title	PO-1	PO-2	PO-3	PO-4	PO-5	PO-6	PO-7	PO-8	PSO-1	PSO-2	PSO-3	PSO-4
1	General Anatomy	3	1	2			1					3	3
1	General Physiology	2		1	1	1				2			
1	HCDS	1	1	1	2	1		2	1	2			1
1	General Microbiology	2	1	1	2	1				2			
1	Applied Physics			2		2			1	2			1
2	General Biochemistry	3	1	1		2				2			
2	General Pharmacology	3			2	2			1	3			1
2	General Pathology	2		1	1	2			1	2			1
2	Directed Clinical Exposure-1	3	1					1	2	2	1		3
2	Concepts of hospital Infection				3	3		3		3		1	

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	prevent ion												
3	Basic concepts in renal disease	2		2		1		2	3	2	3	1	1
3	Applied Pharmacolo gyrelated to dialysis	3	1	1		1				1			
3	Direct ed Clinic al Education-2	3	2	2	1	2		2	1	2	3	1	1
4	Techniques in Hemodialysis	3	2	1		1		3	2	3	2	1	
4	Investigations in Renal Diseases	2			2	2		3	2	3			2
4	Direct ed Clinic al Education-3	3	2	2	1	2		2	1	2	3	1	1

26. Co-curricular Activities

Students are encouraged to take part in co-curricular activities like seminars, conferences, symposia, paper writing, attending industry exhibitions, project competitions and related activities for enhancing their knowledge and networking.

27. Cultural and Literary Activities

Annual cultural festivals are held to showcase the creative talents in students. They are involved in planning and organizing the activities.

28. Sports and Athletics

Students are encouraged to take part in sports and athletic events regularly. Annual sports meet will be held to demonstrate sportsmanship and competitive spirit.

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Programme Structure and Course Details of B.Sc. (Hons) –Dialysis Therapy Technology

(DTT 2022-2026)

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Dialysis Therapy Technology (DTT)
2022-2026

SEMESTER 1

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Course Specifications: General Anatomy

Course Title	General Anatomy
Course Code	AHD101A
Department	Allied Health Science
Faculty	Faculty of Life and Allied Health Sciences

I. Course Summary

1. Aim and Summary:

The course aims to impart basic knowledge of general human anatomy which forms the basis for understanding other related subjects such as physiology, pathology and surgery. Emphasis will be placed on cell structure and functions. The various basic tissues of the body, their structure and functional co-relation will be taught. Formation of gametes and early development of the human fetus will be dealt with in short. Various organ systems, their components and basic functions will be covered under this course.

2. Course Size and Credits:

Number of credits	03
Total hours of class room interaction during the semester	30
Number of practical/tutorial hours	15
Number of semester weeks	16
Department responsible	Allied Health Sciences
Course evaluation	Total Marks: 100
Pass requirement	As per the Academic Regulations
Attendance requirement	As per the Academic Regulations

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II. Teaching, Learning and Assessment

1. Course Outcomes (CO)

Upon completion of this course students will be able to:

No.	Intended Learning Outcomes
1.	Describe the structure and functional organization of a basic human cell and
2.	the normal anatomical positions and planes of the body
3.	Explain the structure and functions of basic tissues
4.	Explain the components of the organ systems and its basic functions
5.	Identify the parts of a compound microscope and differentiate microscopy of basic tissues
6.	Demonstrate the parts and position of bones in the human body and early development of fetus

2. Course Contents:

Introduction

- Introduction to the human body as a whole
- Anatomical terms, planes and positions
- The cell: Structure, function and multiplication

Tissues

- Types, structure, characteristics, functions
- Simple and Compound Epithelium
- Connective tissue
- Cells, fibers and types
- Cartilage, Blood vessels, Muscle, Bone, Nervous tissue, Skin and SalivaryGlands

Embryology

- Fertilization and General embryology

Osteology

- Axial skeleton (Skull: Cranium, air sinuses, Vertebral column: regions, movements and characteristics, Sternum, Ribs) Appendicular skeleton (Bones involving Shoulder girdle and Upper limb, Pelvic girdle and lower limb, healing of bones: cellular activity, Factors that delay healing, Diseases of bonesand joints)
- Development of bone and stages of ossification

Organ systems

- Musculoskeletal system
- Digestive system
- Respiratory system
- Circulatory system

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• Excretory system • Nervous system • Integumentary system • Endocrine system • Lymphoid system
Practical • Histology of epithelium • Histology of Connective tissue • Histology of cartilage • Histology of bone • Histology of muscle • Histology of nervous tissue • Histology of blood vessels • Histology of skin • Histology of Salivary glands • Demonstration of embryology models • Demonstration of bones Surface anatomy of all organ system • Interpretation of Radio images

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3. Course Map (CO-PO-PSO Map)

	Programme Outcomes (POs)								Programme Specific Outcomes (PSOs)			
	PO-1	PO-2	PO-3	PO-4	PO-5	PO-6	PO-7	PO-8	PSO-1	PSO-2	PSO-3	PSO-4
CO-1	2			1					2			
CO-2	2								2			
CO-3	2				1				2			
CO-4	2		1		1				2			
CO-5	2								1			
3: Very Strong Contribution, 2: Strong Contribution, 1: Moderate Contribution												

4. Course Teaching and Learning Methods

Teaching and Learning Methods	Duration in hours	Total Duration in Hours
Face to Face Lectures		1
Demonstrations		
1. Demonstration using Videos		
2. Demonstration using Physical Models/ Systems		
3. Demonstration on a Computer		
Numeracy		
1. Solving Numerical Problems		
Practical Work		
1. Course Laboratory		

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2. Computer Laboratory		
3. Engineering Workshop/Course Workshop/Kitchen		
4. Clinical Laboratory	15	
5. Hospital		
6. Model Studio		
Others		
1. Case Study Presentation	05	
2. Guest Lecture		
3. Industry/Field Visit		16
4. Brain Storming Sessions		
5. Group Discussions	10	
6. Discussing Possible Innovations	01	
Written Examination (Mid-Term tests and SEE)		10
Total Duration in Hours		55

5. Method of Assessment

Continuous Evaluation Policies: Continuous evaluation depends on the type of the course as discussed below:

Theory Component CE			**Laboratory Component CE**	**SEE**
SC1 (Written Assignment)	SC2 (Innovative assignment)	SC3 (Mid-term test)	SC4 (Formative laboratory performance assessment)	SEE
20 Marks	20 Marks	20 Marks	30 Marks	60 (40 written exam;
				20 Viva-voce)

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In CE there shall be four subcomponents of CE (SC1, SC2, SC3, and SC4), namely Mid Term; Written Assignment; Innovative assignments; and Laboratory performance assessment. Each subcomponent is evaluated individually accounting to 60% Weightage as indicated in Course Specifications. The innovative assignment subcomponents can be of any of the following types:

a) Online Test
b) Assignments/Problem Solving
c) Field Assignment
d) Open Book Test
e) Portfolio
f) Reports
g) Case Study
h) Group Task

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i) Laboratory / Clinical Work Record
j) Computer Simulations
k) Creative Submission
l) Virtual Labs
m) Viva / Oral Exam
n) Lab Manual Report
o) Any other

After the four subcomponents are evaluated, the CE component marks are consolidated to attain 60% Weightage. Laboratory/Practical shall be shifted as part of CE. The lab component as part of CE will have external examiner evaluation and marks listed separately for industry requirements. For a theory + laboratory course, the Semester End Examination shall be a 2-hour theory paper of 50 marks with a weightage of 40% and there will be a 20 marks Viva- Voce. In summary, the ratio of Formative (Continuous Evaluation-CE) Vs Summative (Semester End Examination-SEE) should be 60:40.

6. Achieving learning outcomes

The following skills are directly or indirectly imparted to the students in the following teaching and learning methods:

S.No	Curriculum and Capabilities	How imparted during the course
1.	Knowledge	Class room lectures
2.	Understanding	Class room lectures
3.	Critical Skills	Class room lectures
4.	Analytical Skills	Group discussion
5.	Problem Solving Skills	Case discussions
6.	Practical Skills	Case discussions
7.	Group Work	case study and group discussions
8.	Self-Learning	Seminars
9.	Written Communication Skills	Examination
10.	Verbal Communication Skills	Group discussions
11.	Presentation Skills	Seminars, Case discussions
12.	Behavioral Skills	Group discussion, Case discussions
13.	Information Management	Case discussions
15.	Leadership Skills	Group discussions

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III. Course Resources

a. Essential Reading

- BD Chaurasia; 2015; Handbook of General Anatomy, 5th Edition; CBS Publishing.
- IB Singh; 2016; Textbook of Human Histology, 8th Edition; Jaypee Brothers Medical Publishers.IB Singh; 2017; Human Embryology, 11thEdition; Jaypee Brothers Medical Publishers.
- General Anatomy and Physiology – by Dr. Venkatesh
- Surface and Radiological Anatomy- with a Clinical Perspective- by Dr. Ashwini C A, 1st Edition,
- Jaypee Publishers, New Delhi

b. Recommended Reading

- Anne Waugh, Allison Grant; 2018; Ross & Wilson Anatomy and Physiology in Health and Illness; 13th edition; Elsevier Churchill Livingstone.
- Adam W.M. Mitchell, Richard Drake, A. Wayne Vogl; Gray's anatomy for Students; 3rd edition; Elsevier Churchill Livingstone.

c. Magazines and Journals

d. Websites

IV. Course Organization

Course Title		General Anatomy
Course Code		AHD101A
Course Leader/s Name		
Course Leader Contact Details	**Phone:**	080 – 49065555
	E- mail:	
Course Specifications Approval		June 2022
Next Course Specifications Review		June 2026

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Course Specifications: General Physiology

Course Title	General Physiology
Course Code	AHD102A
Department	Allied Health Science
Faculty	Faculty of Life and Allied Health Sciences

I. Course Summary

1. Aim and Summary

The course aims to impart basic knowledge and sufficient exposure to the physiological concepts and principles with emphasis on applied aspects of organ systems in the body, and to provide the foundations needed for further studies in pharmacology, pathology, pathophysiology and medicine.

The mechanisms of deranged function will be appreciated with an in-depth understanding of basic biophysical and physiological mechanisms. The purpose of developing these core competency criteria is to provide guidelines for the breadth and depth of knowledge in the physiological principles and concepts that are considered minimal and essential for further progress in understanding mechanisms of disease and body defenses.

2. Course Size and Credits:

Number of credits	03
Total hours of class room interaction during the semester	30
Number of practical/tutorial hours	15
Number of semester weeks	16
Department responsible	Allied Health Sciences
Course evaluation	Total Marks: 100
Pass requirement	As per the Academic Regulations
Attendance requirement	As per the Academic Regulations

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Approved by the Academic Council at its 26th meeting held on 14 July 2022

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II. Teaching, Learning and Assessment

1. Course Outcomes (CO)

Upon completion of this course students will be able to:

No.	Course outcomes
1.	Describe the functions of the organ systems in the body
2.	Explain the mechanisms for the execution of these functions for homeostasis
3.	through the secretions of chemical and humoral factors
4.	Explain the regulatory mechanisms in the control of blood pressure, urine
5.	formation maintenance of extracellular and intracellular volume
6.	Perform to assess the normal values and parameters of the bodily function

2. Course Contents:

Course Content
Blood Composition and function of blood, blood bank, blood transfusion, erythrocytesedimentation rate (ESR) and packed cell volume, anemia, body fluids.
Cardiovascular System Heart and its muscles, cardiac output, heart sounds, blood pressure, hypertension, ECG.
Digestive System Physiological anatomy of gastro intestinal tract, functions of digestive system, salivarygland's structure and functions, deglutition, stomach, gastric secretion, pancreas, functions of liver, gall bladder, intestine and lipids.
Respiratory System Functions of respiratory system, physiological anatomy of respiratory system. Mechanism of normal and rigorous respiration. Intra pulmonary pleural pressure, surface tension, recoil tendency of the wall. Transportation of respiratory gases lung volumes and capacities, regulation of respiration.
Endocrine System Definition classification of endocrine glands & physiological, anatomy, hormonesecreted, physiological function, and their hormones functions of endocrine glands regulation of secretion. Disorders - hypo and hyper secretion of hormone.
Nervous system Functions of nervous system, neuron structure, classification and properties. Neuroglia, nerve fiber, classification, conduction of impulses continuous and saltatory. Velocity of impulse. Synapse - Structure, types, properties. Receptors and synapses - Definition, classification, properties. Reflex action - Unconditioned properties of reflex action. Babinski's sign. Spinal cord nerve tracts. Ascending tracts, descending tracts - pyramidal tracts - extrapyramidal tracts. Functions of brain EEG. Cerebra

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3. Course Map (CO-PO-PSO Map)

	Programme Outcomes (POs)								Programme Specific Outcomes (PSOs)			
	PO-1	PO-2	PO-3	PO-4	PO-5	PO-6	PO-7	PO-8	PSO-1	PSO-2	PSO-3	PSO-4
CO-1	2			1					2			
CO-2	2								2			
CO-3	2				1				2			
CO-4	2		1		1				2			
CO-5	2								1			
3: Very Strong Contribution, 2: Strong Contribution, 1: Moderate Contribution												

4. Course Teaching and Learning Methods

Teaching and Learning Methods	Duration in hours	Total Duration in Hours
Face to Face Lectures		20
Demonstrations		2
2. Demonstration using Videos	2	
2. Demonstration using Physical Models/ Systems		
3. Demonstration on a Computer		
Numeracy		
1. Solving Numerical Problems		
Practical Work		33
1. Course Laboratory	25	
2. Computer Laboratory		
3. Engineering Workshop/Course Workshop/Kitchen		
4. Clinical Laboratory	8	
5. Hospital		
6. Model Studio		
Others		20
1. Case Study Presentation	3	
2. Guest Lecture		
3. Industry/Field Visit		
4. Brain Storming Sessions	6	
5. Group Discussions	10	
6. Discussing Possible Innovations		
Written Examination (Mid-Term tests and SEE)		05
Total Duration in Hours		70

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5. Method of Assessment

Continuous Evaluation Policies: Continuous evaluation depends on the type of the course as discussed below:

Theory Component CE			**Laboratory Component CE**	**SEE**
SC1 (Written Assignment)	SC2 (Innovative assignment)	SC3 (Mid-term test)	SC4 (Formative laboratory performance assessment)	SEE
20 Marks	20 Marks	20 Marks	30 Marks	60 (40 written exam;
				20 Viva-voce)

In CE there shall be four subcomponents of CE (SC1, SC2, SC3, and SC4), namely Mid Term; Written Assignment; Innovative assignments; and Laboratory performance assessment. Each subcomponent is evaluated individually accounting to 60% Weightage as indicated in Course Specifications. The innovative assignment subcomponents can be of any of the following types:

a) Online Test
b) Assignments/Problem Solving
c) Field Assignment
d) Open Book Test
e) Portfolio
f) Reports
g) Case Study
h) Group Task
i) Laboratory / Clinical Work Record
j) Computer Simulations
k) Creative Submission
l) Virtual Labs
m) Viva / Oral Exam
n) Lab Manual Report
o) Any other

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After the four subcomponents are evaluated, the CE component marks are consolidated to attain 60% Weightage. Laboratory/Practical shall be shifted as part of CE. The lab component as part of CE will have external examiner evaluation and marks listed separately for industry requirements. For a theory + laboratory course, the Semester End Examination shall be a 2-hour theory paper of 50 marks with a weightage of 40% and there will be a 20 marks Viva- Voce. In summary, the ratio of Formative (Continuous Evaluation-CE) Vs Summative (Semester End Examination-SEE) should be 60:40.

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6. Achieving learning outcomes

The following skills are directly or indirectly imparted to the students in the following teaching and learning methods:

S.No	Curriculum and Capabilities	How imparted during the course
1.	Knowledge	Class room lectures
2.	Understanding	Class room lectures
3.	Critical Skills	Class room lectures
4.	Analytical Skills	Group discussion
5.	Problem Solving Skills	Case discussions
6.	Practical Skills	Case discussions
7.	Group Work	case study and group discussions
8.	Self-Learning	Seminars
9.	Written Communication Skills	Examination
10.	Verbal Communication Skills	Group discussions
11.	Presentation Skills	Seminars, Case discussions
12.	Behavioral Skills	Group discussion, Case discussions
13.	Information Management	Case discussions
15.	Leadership Skills	Group discussions

V. Course Resources

a. Essential Reading

- Gerard J. Tortora, Bryan H. Derrickson (2013) Principles of Anatomy and Physiology 14th Edition. Wiley publications
- Sujit Kumar Chaudhuri (2011) Concise Medical New Central Book
- Chatterjee CC (2005) Human Physiology Volume 1 and 2 11th edition CBS publishers
- D. Venkatesh, H.H. Sudhakar (2015) Textbook of Medical Physiology. Lippincott Williams & Wilkins

b. Recommended Reading

- Guyton and Hall (2016) Textbook of Medical Physiology, 13edition Elsevier's publications
- Parveen Kumar and Michel Clark (2016) Kumar and Clark's Clinical Medicine Ninth edition
- Ganong's Review of Medical Physiology, 24th Edition (LANGE Basic Science) 24th Edition

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c. Magazines and Journals

d. Websites

VI. Course Organization

Course name		General Physiology
Course code		AHD102A
Course Leader/s Name		
Course Leader Contact Details	**Phone:**	080 – 49065555
	E- mail:	
Course Specifications Approval		
Next Course Specifications Review		

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Course Specifications: Health Care Delivery Systems of India

Course Title	Health Care Delivery Systems of India
Course Code	AHD103A
Department	Allied Health Science
Faculty	Faculty of Life and Allied Health Sciences

I. Course Summary

1. Aim and Summary

The aim of the course is to introduce students to the Indian system of health care, health status of the population and initiatives taken at the national level towards improving health status of the population.

The students are oriented to importance of demography and vital statistics and concept of health and disease. The students are exposed to health care delivery systems such as- Siddha, Unani, Homeopathy, Ayurveda and Yoga and Naturopathy. Students are also introduced to concept of integrating health care system to achieve health, measures taken at National level for improving health status of population including National Health programmes..

2. Course Size and Credits:

Number of credits	02
Total hours of class room interaction during the semester	30
Number of practical/tutorial hours	0
Number of semester weeks	16
Department responsible	Allied Health Sciences
Course evaluation	Total Marks: 50
Pass requirement	As per academic regulation
Attendance requirement	As per academic regulation

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II. Teaching, Learning and Assessment

1. Course Outcomes (CO)

Upon completion of this course students will be able to:

No.	Course outcome
1.	Describe the Health Care delivery system in India at primary, secondary and tertiary level and identify their role in the health care team
2.	Explain the AYUSH system of medicine
3.	Explain the National Health programmes in terms of operation, achievements and constraints
4.	Explain the importance of Demography and Vital statistics in planning health policy
5.	Discuss role of epidemiology and epidemiological methods in health

2. Course Contents:

Introduction to healthcare delivery system • Healthcare delivery system in India at primary, secondaryand tertiary care Community participation in healthcare delivery system • Health system in developed countries Private Sector National Health Mission; National Health Policy and issuesin health care delivery system in India
National Health Programme • Background objectives, action plan, targets, operations, achievements and constraints in various National Heath Programme
Introduction to AYUSH system of medicine • Introduction to Ayurveda Yoga, naturopathy, unani, siddha and homeopathyNeed for integration of various system of medicine
Health scenario of India- past, present and future
Demography & Vital Statistics • Demography – its concept. Vital events of life & its impact on demography • Significance and recording of vital statistics. Census & its impact on healthpolicy
Epidemiology • Principles of Epidemiology. Natural history of disease • Methods of epidemiological studies Epidemiology of communicable & non-communicable diseases, disease transmission, host defense immunizingagents, cold chain, immunization, disease monitoring and surveillance

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3. Course Map (CO-PO-PSO Map)

	Programme Outcomes (POs)												Programme Specific Outcomes (PSOs)			
	PO -1	PO -2	PO -3	PO -4	PO -5	PO -6	PO -7	PO -8					PSO -1	PSO -2	PSO -3	PSO -4
CO-1		1		2	1		2						2			1
CO-2	1		1										2			
CO-3			1	2	1			1					2			
CO-4		1		1	1		2						2			
CO-5	1			1									2			
3: Very Strong Contribution, 2: Strong Contribution, 1: Moderate Contribution																

4. Course Teaching and Learning Methods

Teaching and Learning Methods	Duration in hours	Total Duration in Hours
Face to Face Lectures		25
Demonstrations		
3. Demonstration using Videos		
2. Demonstration using Physical Models/ Systems		
3. Demonstration on a Computer		
Numeracy		
1. Solving Numerical Problems		
Practical Work		
1. Course Laboratory		
2. Computer Laboratory		
3. Engineering Workshop/Course Workshop/Kitchen		
4. Clinical Laboratory		
5. Hospital		
6. Model Studio		
Others		
1. Case Study Presentation		
2. Guest Lecture		
3. Industry/Field Visit		5
4. Brain Storming Sessions		
5. Group Discussions	5	
6. Discussing Possible Innovations		
Written Examination (Mid-Term tests and SEE)		05
Total Duration in Hours		35

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5. Method of Assessment

Continuous Evaluation Policies: Continuous evaluation depends on the type of the course as discussed below:

Theory Component CE			**Laboratory Component CE**	**SEE**
SC1 (Written Assignment)	SC2 (Innovative assignment)	SC3 (Mid-term test)	SC4 (Formative laboratory performance assessment)	SEE
20 Marks	20 Marks	20 Marks	30 Marks	60 (40 written exam;
				20 Viva-voce)

In CE there shall be four subcomponents of CE (SC1, SC2, SC3, and SC4), namely Mid Term; Written Assignment; Innovative assignments; and Laboratory performance assessment. Each subcomponent is evaluated individually accounting to 60% Weightage as indicated in Course Specifications. The innovative assignment subcomponents can be of any of the following types:

a) Online Test
b) Assignments/Problem Solving
c) Field Assignment
d) Open Book Test
e) Portfolio
f) Reports
g) Case Study
h) Group Task
i) Laboratory / Clinical Work Record
j) Computer Simulations
k) Creative Submission
l) Virtual Labs
m) Viva / Oral Exam
n) Lab Manual Report
o) Any other

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After the four subcomponents are evaluated, the CE component marks are consolidated to attain 60% Weightage. Laboratory/Practical shall be shifted as part of CE. The lab component as part of CE will have external examiner evaluation and marks listed separately for industry requirements. For a theory + laboratory course, the Semester End Examination shall be a 2-hour theory paper of 50 marks with a weightage of 40% and there will be a 20 marks Viva- Voce. In summary, the ratio of Formative (Continuous Evaluation-CE) Vs Summative (Semester End Examination-SEE) should be 60:40.

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6. Achieving learning outcomes

The following skills are directly or indirectly imparted to the students in the following teaching and learning method:

S.No	Curriculum and Capabilities	How imparted during the course
1.	Knowledge	Class room lectures
2.	Understanding	Class room lectures
3.	Critical Skills	Class room lectures
4.	Analytical Skills	Group discussion
5.	Problem Solving Skills	Case discussions
6.	Practical Skills	Case discussions
7.	Group Work	case study and group discussions
8.	Self-Learning	Seminars
9.	Written Communication Skills	Examination
10.	Verbal Communication Skills	Group discussions
11.	Presentation Skills	Seminars, Case discussions
12.	Behavioral Skills	Group discussion, Case discussions
13.	Information Management	Case discussions
15.	Leadership Skills	Group discussions

III. Course Resources

1. Essential Reading

- Rothman (2012). Modern Epidemiology. Lippincott Williams and Wilkins Publishers
- Community Medicine with recent advances - AH Suryakantha - 4th Edition - Jaypee Publishers
- Review in Community Medicine - VVR SeshuBabu - 2nd Edition - Paras Medical Books
- Epidemiology for Undergraduates - Marina Rajan Joseph - Jaypee Publishers

2. Recommended Reading

- Park's Textbook of Preventive and Social Medicine - K. Park - 22nd Edition - Bhanot Publishers
- Oxford Textbook of Public Health - Roger Detels - 5th Edition - Oxford University Press
- National Health Programs of India - J Kishore - 12th Edition - Century Publications

3. Magazines and Journals

4. Websites

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IV. Course Organization

Course Title		Health Care DeliverySystems of India
Course Code		AHD103A
Course Leader/s Name		
Course Leader Contact Details	**Phone:**	080 – 49065555
	E- mail:	
Course Specifications Approval		
Next Course Specifications Review		

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Course Specifications: General Microbiology

Course Title	General Microbiology
Course Code	AHD104A
Department	Allied Health Science
Faculty	Faculty of Life and Allied Health Sciences

I. Course Summary

1. Aim and Summary

This course introduces the principles of Microbiology with emphasis on applied aspects of Microbiology of infectious diseases particularly in the principles & practice of sterilization methods, collection and dispatch of specimens for routine microbiological investigations, interpretation of commonly done bacteriological and serological investigations, and control of hospital infections. This will help the students to maintain sterile working environment and appropriate sample collection.

2. Course Size and Credits:

Number of credits	03
Total hours of class room interaction during the semester	30
Number of practical/tutorial hours	30
Number of semester weeks	16
Department responsible	Allied Health Sciences.
Course evaluation	Total Marks: 100
Pass requirement	As per the academic regulation
Attendance requirement	As per the academic regulation

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II. Teaching, Learning and Assessment

1. Course Outcomes (CO)

Upon completion of this course students will be able to:

No.	Course Outcomes
1.	Describe the morphology, physiology and characteristics of microorganisms
2.	Describe the principles and practice of sterilization and disinfection
3.	Discuss immunology, and immunity
4.	Demonstrate sterilization procedures and use of sterilization equipment
5.	Demonstrate Collection and transport of specimens to the laboratory

2. Course Contents:

Course Content
Introduction to Microbiology History, introduction, scope, aims and objectives. Morphology and physiology ofbacteria. Detail account of sterilisation and disinfection. Brief account of culture mediaand culture techniques. Basic knowledge of selection, collection, transport, processing of clinical specimens and identification of bacteria and drug resistance in bacteria
Immunology Infection - Definition, Classification, Source, Mode of transmission andtypes of Infectious disease.Immunity. Structure and functions of Immune system. TheComplement System. Antigen. Immunoglobulins - Antibodies - General structure and the role playedin defence mechanism of the body.Immune response. Antigen - Antibody reactions - with reference to clinical utility. And hHypersensitivity reactions.
Systematic bacteriology Pyogenic cocci - Staphylococcus, Streptococcus, Pneumococcus, Gonococcus, Meningococcus – brief account of each coccus– detailed account of mode of spread, laboratory diagnosis. Mycobacteria - Tuberculosis and Leprosy. Clostridium - Gas gangrene, food poisoning and tetanus. Non-sporing Anaerobes - in brief about classification and morphology,in detail aboutViruses: HIV and Hepatitis- Pathogenesis, Lab Diagnosis and management

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Laboratory:

Demonstration of sterilization equipment's: hot air oven, autoclave, bacterial filters.
Demonstration of commonly used culture media, nutrient broth, nutrient agar, bloodagar, chocolate agar, MacConkey medium, L J media, Robertson cooked meat media.Anaerobic culture methods.
Antibiotic susceptibility test.
Demonstration of common serological tests: ELISA.
Demonstration of Grams staining.
Demonstration of Acid-fast staining.
Sample collection methods, storage and transport.

3. Course Map (CO-PO-PSO Map)

	Programme Outcomes (POs)								Programme Specific Outcomes (PSOs)			
	PO-1	PO-2	PO-3	PO-4	PO-5	PO-6	PO-7	PO-8	PSO-1	PSO-2	PSO-3	PSO-4
CO-1	1								2			
CO-2	2		1		1				2			
CO-3	1		1						2			
CO-4	2				1				2			
CO-5	2	1		2					2			
3: Very Strong Contribution, 2: Strong Contribution, 1: Moderate Contribution												

4. Course Teaching and Learning Methods

Teaching and Learning Methods	Duration in hours	Total Duration in Hours
Face to Face Lectures		24
Demonstrations		
4. Demonstration using Videos		
2. Demonstration using Physical Models/ Systems		
3. Demonstration on a Computer		
Numeracy		
1. Solving Numerical Problems		
Practical Work		26
1. Course Laboratory	16	
2. Computer Laboratory		
3. Engineering Workshop/Course Workshop/Kitchen		
4. Clinical Laboratory	5	
5. Hospital	5	
6. Model Studio		
Others		2
1. Case Study Presentation	2	
2. Guest Lecture		

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3. Industry/Field Visit		
4. Brain Storming Sessions		
5. Group Discussions		
6. Discussing Possible Innovations	05	
Written Examination (Mid-Term tests and SEE)		8
Total Duration in Hours		60

5. Method of Assessment

Continuous Evaluation Policies: Continuous evaluation depends on the type of the course as discussed below:

Theory Component CE			**Laboratory Component CE**	**SEE**
SC1 (Written Assignment)	SC2 (Innovative assignment)	SC3 (Mid-term test)	SC4 (Formative laboratory performance assessment)	SEE
20 Marks	20 Marks	20 Marks	30 Marks	60 (40 written exam;
				20 Viva-voce)

In CE there shall be four subcomponents of CE (SC1, SC2, SC3, and SC4), namely Mid Term; Written Assignment; Innovative assignments; and Laboratory performance assessment. Each subcomponent is evaluated individually accounting to 60% Weightage as indicated in Course Specifications. The innovative assignment subcomponents can be of any of the following types:

a) Online Test
b) Assignments/Problem Solving
c) Field Assignment
d) Open Book Test
e) Portfolio
f) Reports
g) Case Study
h) Group Task
i) Laboratory / Clinical Work Record
j) Computer Simulations
k) Creative Submission
l) Virtual Labs
m) Viva / Oral Exam
n) Lab Manual Report
o) Any other

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After the four subcomponents are evaluated, the CE component marks are consolidated to attain 60% Weightage. Laboratory/Practical shall be shifted as part of CE. The lab component as part of CE will have external examiner evaluation and marks listed separately for industry requirements. For a theory + laboratory course, the Semester End Examination shall be a 2-hour theory paper of 50 marks with a weightage of 40% and there will be a 20 marks Viva- Voce. In summary, the ratio of Formative (Continuous Evaluation-CE) Vs Summative (Semester End Examination-SEE) should be 60:40.

6. Achieving learning outcomes

The following skills are directly or indirectly imparted to the students in the following teaching and learning methods:

S.No	Curriculum and Capabilities Skills	How imparted during the course
1.	Knowledge	Lecture
2.	Understanding	lecture
3.	Critical Skills	Assignments, case study discussion, small group discussion
4.	Analytical Skills	Assignments, case study discussion, small group discussion
5.	Problem Solving Skills	Assignments
6.	Practical Skills	-OSPE
7.	Group Work	Assignments
8.	Self-Learning	Assignment, OSPE
9.	Written Communication Skills	Assignment, Examination
10.	Verbal Communication Skills	Small group discussion
11.	Presentation Skills	Small group discussion
12.	Behavioral Skills	-
13.	Information Management	Assignment
14.	Personal Management	-
15.	Leadership Skills	-

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III. Course Resources

1. Essential Reading

- Edmonstone. (2019). Systems Leadership in Health and Social Care. 1st Ed.
- Class notes
- Ananth Narayan, R. &Panicker, C.K.J., 2009. Textbook of Microbiology. 8th ed. Hyderabad: Universities Press (India) Pvt. Ltd.
- Evan Roitt etal, Immunology. 3rd ed. USA: McGraw Hill Companies Inc.

2. Recommended Reading

- Apurba S. Sastry & Sandhya Bhat K; Essentials of medical microbiology. Jaypee. The health Sciences Publisher

3. Magazines and Journals

4. Websites

IV. Course Organization

Course Code		AHD104A
Course Title		General Microbiology
Course Leader/name		Dr. Tushar Shaw
Course Leader Contact Details	**Phone**	080 – 49065555
	E- mail	
Course Specifications Approval		June 2022
Next Course		June 2026

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Course Specifications: Basic Electrical & Electronics

Course Title	Basic Electrical & Electronics
Course Code	AHD106A
Department	Allied Health Science
Faculty	Faculty of Life and Allied Health Sciences

I. Course Summary

1. Aim and Summary

This course deals with basic principles and concepts of Elements of Electrical and Electronics as applied to biomedical instrumentation. Students are taught the fundamentals of circuit analysis, magnetic circuits, DC machines and transformers. In addition, principles of PN junction diode, Zener diode, semiconductor devices such as transistors, amplifiers and power supplies.

2. Course Size and Credits:

Number of credits	03
Total hours of class room interaction during the semester	45
Number of practical/tutorial hours	30
Number of semester weeks	16
Department responsible	Electrical and Electronic Engineering
Course evaluation	Total Marks: 100
Pass requirement	As per the Academic Regulations
Attendance requirement	As per the Academic Regulations

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II. Teaching, Learning and Assessment

1. Course Outcomes (CO)

Upon completion of this course students will be able to:

No.	Course Outcome
1.	State various laws of electric and magnetic circuits and explain them significance in biomedical instrumentation
2.	Explain DC machines, transformers and their applications
3.	Solve simple numerical problems on electric circuits and magnetic circuits,
4.	Explain working principles of PN junction diode, Zener diode, transistors and amplifier configurations

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5.	Demonstrate electrical and electronic circuits for hardware modules using standard EDA tool

2. Course Contents:

Course Content
DC and AC Fundamentals: Circuit elements, Voltage and Current Division, Ohm's Law and Kirchhoff's Laws,Sinusoidal voltage and currents, concept of cycle period, frequency, peak factor andform factor, phase difference, lagging, leading and in phase quantities. Study of AC circuits of pure R, L and C.
Magnetic Circuits: Magnetic effect of electrical current, Faraday's law of electromagnetic induction, statically and dynamically induced EMF's, self and mutual inductance, concepts of MMF, flux, flux density, reluctance, permeability and field strength, their units andrelationship. Simple series and parallel magnetic circuits. Basic analogy between electric and magnetic circuits.
DC Machines and Transformers: Constructional details, working principle and methods of excitation of DC machineas a generator and a motor. Necessity of transformer, Constructional Details (core and shell types), Principle of operation, Ideal Transformer and Practical Transformer. Applications of DC machines and transformers in medical instrumentation.
Basic concepts in Electronics: Semiconductor: p-type, n-type; p-n junction diode, its characteristics, half wave, full wave and bridge type rectifiers, basic filter circuits, Zener diode characteristics,Zener diode as a voltage regulator.
Transistors: Transistor configurations: CB, CE and CC; Transistor parameters: alpha, beta andgamma, working of transistor as a switch, Amplifier, Characteristics of JFET,.
Amplifiers: Differential amplifiers and their transfer characteristics, IC Op-Amps, their ideal and practical characteristics, Op-Amp in different modes as inverting amplifier, non- inverting amplifier, summing amplifier, scale changer, differentiator and integrator.Lab course Design and simulate following circuits using standard EDA tool 1. Verification of Ohms Law.

3. Course Map (CO-PO-PSO Map)

	Programme Outcomes (POs)								Programme Specific Outcomes (PSOs)			
	PO-1	PO-2	PO-3	PO-4	PO-5	PO-6	PO-7	PO-8	PSO-1	PSO-2	PSO-3	PSO-4
CO-1			2		2			1	2			1
CO-2			2		1				2			
CO-3					2				2			
CO-4			2		1				1			
CO-5					1				1			
3: Very Strong Contribution, 2: Strong Contribution, 1: Moderate Contribution												

4. Course Teaching and Learning Methods

Teaching and Learning Methods	Duration in hours	Total Duration in Hours
Face to Face Lectures		15
Demonstrations		
5. Demonstration using Videos		
2. Demonstration using Physical Models/ Systems		
3. Demonstration on a Computer		
Numeracy		15
1. Solving Numerical Problems	15	
Practical Work		
1. Course Laboratory		
2. Computer Laboratory		
3. Engineering Workshop/Course Workshop/Kitchen		
4. Clinical Laboratory		
5. Hospital		
6. Model Studio		
Others		
1. Case Study Presentation	12	
2. Guest Lecture		
3. Industry/Field Visit		25
4. Brain Storming Sessions	05	
5. Group Discussions	08	
6. Discussing Possible Innovations		
Written Examination (Mid-Term tests and SEE)		05
Total Duration in Hours		60

5. Method of Assessment

Continuous Evaluation Policies: Continuous evaluation depends on the type of the course as discussed below:

Theory Component CE			Laboratory Component CE	SEE
SC1 (Written Assignment)	SC2 (Innovative assignment)	SC3 (Mid-term test)	SC4 (Formative laboratory performance assessment)	SEE
20 Marks	20 Marks	20 Marks	30 Marks	60 (40 written exam; 20 Viva-voce)

Approved by the Academic Council at its 26th meeting held on 14 July 2022

In CE there shall be four subcomponents of CE (SC1, SC2, SC3, and SC4), namely Mid Term; Written Assignment; Innovative assignments; and Laboratory performance assessment. Each subcomponent is evaluated individually accounting to 60% Weightage as indicated in Course Specifications. The innovative assignment subcomponents can be of any of the following types:

a) Online Test
b) Assignments/Problem Solving
c) Field Assignment
d) Open Book Test
e) Portfolio
f) Reports
g) Case Study
h) Group Task
i) Laboratory / Clinical Work Record
j) Computer Simulations
k) Creative Submission
l) Virtual Labs
m) Viva / Oral Exam
n) Lab Manual Report
o) Any other

After the four subcomponents are evaluated, the CE component marks are consolidated to attain 60% Weightage. Laboratory/Practical shall be shifted as part of CE. The lab component as part of CE will have external examiner evaluation and marks listed separately for industry requirements. For a theory + laboratory course, the Semester End Examination shall be a 2-hour theory paper of 50 marks with a weightage of 40% and there will be a 20 marks Viva- Voce. In summary, the ratio of Formative (Continuous Evaluation-CE) Vs Summative (Semester End Examination-SEE) should be 60:40.

6. Achieving learning outcomes

The following skills are directly or indirectly imparted to the students in the following teaching and learning methods:

S.No	Curriculum and Capabilities Skills	How imparted during the course
1.	Knowledge	Class room lectures, Assignments
2.	Understanding	Class room lectures, Assignments
3.	Critical Skills	Class room lectures, Assignments
4.	Analytical Skills	Class room lectures, Assignments
5.	Problem Solving Skills	Class room lectures, Assignments
6.	Practical Skills	
7.	Group Work	Assignment
8.	Self-Learning	Assignment
9.	Written Communication Skills	Assignment, Examination

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10.	Verbal Communication Skills	
11.	Presentation Skills	
12.	Behavioral Skills	Course work
13.	Information Management	Assignment, Examination
14.	Personal Management	Course work
15.	Leadership Skills	

III. Course Resources

1. Essential Reading

- Class Notes
- Edward Hughes, (2002), Electrical and Electronics Technology, ELBS, 6th edition
- Millman and Halkias, (2001) Integrated Electronics, Tata McGraw-Hill Education

2. Recommended Reading

- F Mittle, V.N., (2007) Basic Electrical and Electronics Engineering, Tata McGraw Hill Edition, New Delhi, 1st edition
- Delton Horn T., (1993) Abraham Pallas, Basic Electricity and Electronics, Europe, McGraw-Hill Limited

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3. Magazines and Journals

4. Websites

- Basic Electrical Technology (2013) http://freevideolectures.com/Course/2335/Basic- Electrical-Technology/23
- IITM Lectures (2013) http://www.nptel.iitm.ac.in/courses/108105017/

IV. Course Organization

Course Code		AHD106A
Course Title		Basic Electrical and Electronics
Course Leader/s Name		As per Time - table
Course Leader Contact Details	**Phone:**	49065555
	E-mail:	< hod.ee.et@msruas.ac.in>
Course Specifications Approval Date		2019

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Course Specifications: Applied Physics

Course Title	Applied Physics
Course Code	AHD105A
Department	Applied Physics
Faculty	Life and Applied Health Sciences

I. Course Summary

1. Aim and Summary

The aim of this course is to impart basic concepts of Physics and its application to solve medical problems.

The students are taught the basic topics in physics which include electromagnetic theory, electricity and magnetism, lasers and fiber optics. Interaction of radiation with matter will be discussed.

2. Course Size and Credits:

Number of credits	3
Total hours of class room interaction during the semester	30
Number of practical/tutorial hours	30
Number of semester weeks	16
Department responsible	Faculty of Mathematical & Physical
Course evaluation	Total Marks: 100
Pass requirement	As per the Academic Regulations
Attendance requirement	As per the Academic Regulations

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II. Teaching, Learning and Assessment

1. Course Outcomes (CO)

Upon completion of this course students will be able to:

No.	Course Outcome
1.	Explain the basic concepts in sound, electricity and magnetism, laser physics and electromagnetic radiation
2.	Describe concepts in optical fibers,
3.	Describe basic properties of fluids
4.	Conduct experiments as per the standard procedures and tabulate the measured Values

2. Course Contents:

Course Content
Basic Physics: Sound -The nature and propagation of sound wave (the characteristics of sound, wave theory), speed of sound in a material medium, intensity of sound, the decibel, Interference of sound waves, beats, diffraction, Doppler effect , Applications of Doppler effect
Optical fiber : **Basic working principle of optical fibers : Types and structure of Optical fibers, modes of propagation,** Refractive index profiles of step index and graded index fibers, Attenuation, Different types of loss mechanisms, Fiber optic application in medical field.
Electricity and Magnetism: A.C. and D.C. power supply with examples, single phase and poly phase power supply, switches, fuses, circuit breakers, earthing etc. main voltage drop: causes and remedy, cables; low tension, high tension. Magnets and magnetic field, force on an electric current in a magnetic field, force on electric charge moving in a magnetic field, Ampere's law, electromagnet and solenoids
Electromagnetic radiation: Electromagnetic radiation spectrum, common properties of electromagnetic radiation; relationship between energy, frequency, wavelength and velocity e.g. X-rays and gamma rays. Transmission through matter, law of exponential attenuation- practical aspects of radiation absorption and transmission through body tissues
Characteristics of laser light, Absorption, spontaneous emission and stimulated emission, Requisite conditions for production of a laser beam, Nd-YAG Laser, Semiconductor laser, Applications of laser to medical field
Fluid mechanics: Rate of flow —lines and tubes of flow—Streamline and turbulent flow— Bernoulli's theorem and its applications-Reynold's number- viscosity —Derivation of Poiseuille's equation –Experimental determination of viscosity of a liquid, Surface tension—capillary rise Diffusion—Fick's law—Graham's law for diffusion of gases, biomedical applications

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3. Course Map (CO-PO-PSO Map)

	Programme Outcomes (POs)								Programme Specific Outcomes (PSOs)			
	PO-1	PO-2	PO-3	PO-4	PO-5	PO-6	PO-7	PO-8	PSO-1	PSO-2	PSO-3	PSO-4
CO-1			2		2			1	2			1
CO-2			2		1				2			
CO-3					2				2			
CO-4			2		1				1			
CO-5					1				1			
CO-6					2				2			
3: Very Strong Contribution, 2: Strong Contribution, 1: Moderate Contribution												

4. Course Teaching and Learning Methods

Teaching and Learning Methods	Duration in hours	Total Duration in Hours
Face to Face Lectures		25
Demonstrations		3
6. Demonstration using Videos	3	
2. Demonstration using Physical Models/ Systems		
3. Demonstration on a Computer		
Numeracy		
1. Solving Numerical Problems		
Practical Work		18
1. Course Laboratory	18	
2. Computer Laboratory		
3. Engineering Workshop/Course Workshop/Kitchen		
4. Clinical Laboratory		
5. Hospital		
6. Model Studio		
Others		6
1. Case Study Presentation		
2. Guest Lecture		
3. Industry/Field Visit		
4. Brain Storming Sessions		
5. Group Discussions	6	
6. Discussing Possible Innovations		
Written Examination (Mid-Term tests and SEE)		08
Total Duration in Hours		60

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5. Method of Assessment

Continuous Evaluation Policies: Continuous evaluation depends on the type of the course as discussed below:

Theory Component CE			Laboratory Component CE	SEE
SC1 (Written Assignment)	SC2 (Innovative assignment)	SC3 (Mid-term test)	SC4 (Formative laboratory performance assessment)	SEE
20 Marks	20 Marks	20 Marks	30 Marks	60 (40 written exam;
				20 Viva-voce)

In CE there shall be four subcomponents of CE (SC1, SC2, SC3, and SC4), namely Mid Term; Written Assignment; Innovative assignments; and Laboratory performance assessment. Each subcomponent is evaluated individually accounting to 60% Weightage as indicated in Course Specifications. The innovative assignment subcomponents can be of any of the following types:

a) Online Test
b) Assignments/Problem Solving
c) Field Assignment
d) Open Book Test
e) Portfolio
f) Reports
g) Case Study
h) Group Task
i) Laboratory / Clinical Work Record
j) Computer Simulations
k) Creative Submission
l) Virtual Labs
m) Viva / Oral Exam
n) Lab Manual Report
o) Any other

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After the four subcomponents are evaluated, the CE component marks are consolidated to attain 60% Weightage. Laboratory/Practical shall be shifted as part of CE. The lab component as part of CE will have external examiner evaluation and marks listed separately for industry requirements. For a theory + laboratory course, the Semester End Examination shall be a 2-hour theory paper of 50 marks with a weightage of 40% and there will be a 20 marks Viva- Voce. In summary, the ratio of Formative (Continuous Evaluation-CE) Vs Summative (Semester End Examination-SEE) should be 60:40.

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6. Achieving learning outcomes

The following skills are directly or indirectly imparted to the students in the following teaching and learning methods:

S.No	Curriculum and CapabilitiesSkills	How imparted during the course
1.	Knowledge	Classroom lectures
2.	Understanding	Class room lectures,
3.	Critical Skills	Assignment
4.	Analytical Skills	Class room, assignment
5.	Problem Solving Skills	Class room, assignment
6.	Practical Skills	Class room, assignment
7.	Group Work	Classroom
8.	Self-Learning	Assignment
9.	Written Communication Skills	Assignment, examination
10.	Verbal Communication Skills	--
11.	Presentation Skills	--
12.	Behavioral Skills	Course work
13.	Information Management	Assignment, examination
14.	Personal Management	Assignment, examination
15.	Leadership Skills	--

III. Course Resources

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1. Essential Reading

- Class notes
- David Halliday, Robert Resnick and Jearl Walker, (2013) Fundamentals of Physics, New York, John Wiley & Sons.
- Murugeshan, R., (2008) Electricity and Magnetism, 7th Edition, S. Chand and Company
- Arora, C. L., (2007) B.Sc. Practical Physics, S. Chand and Company Ltd.
- William E. J McKinneyRadiographic latent image processing –American Society for Nondestructive Testing (1982)
- W. J. Meredith & J.B. Massey. Fundamental Physics of Radiology 1992(Varghese Publishing House).

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- Robin J. Wilks, Principles of Radiological Physics, 2nd Revised edition (Oct. 1 1987)Churchill Livingstone;
- George A. Hay , Donald J. Hughes First-year Physics for Radiographers 3rd Revised edition (1997) BaillliereTindall;

2. Recommended Reading

- Geoffery Rose (2008). Rose's strategy of preventive medicine. OUP Oxford Publishers
- Basic Medical Radiation physics – by L Stanton Stanton 1963 (Butterworth)
- Thomas S. Curry III James E. Dowdey, Robert E. Murry Jr. Christensen's Physics of Diagnostic Radiology Fourth EditionLWW (August 1, 1990)
- Thayalan, K., (2003) Basic Radiological Physics,New Delhi, Jayapee Brothers Medical Publishing Pvt. Ltd.
- Bushberg, Seibert, Leidholdt and Boone, (2002) The essential physics of Medical Imaging,North America, Lippincot Williams and Wilkins.

3. Magazines and Journals

4. Websites

- www.ocw.mit.edu/courses/physics
- http://nptel.ac.in/

IV. Course Organization

Course		Applied Physics
Course		AHD105A
Course Leader/s Name		As per time table
Course Leader Contact Details	**Phone:**	080 – 49065555
	E- mail:	hod.pi.mp@msruas.ac.in
Course Specifications Approval		May 2019
Next Course Specifications Review		May 2023

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Dialysis Therapy Technology (DTT)
2022-2026

SEMESTER 2

Course Specifications: General Biochemistry

Course Title	General Biochemistry
Course Code	AHD107A
Department	Allied Health Science
Faculty	Faculty of Life and Allied Health Sciences

I. Course Summary

1. Aim and Summary

The course aims to impart basic knowledge on biochemistry and its role in health and diseases, emphasizing on the diagnostic aspect of the subject. The course is designed to provide an understanding of the basic process of life in molecular terms. The students are oriented to chemistry of carbohydrates, proteins, lipids, and various metabolic pathways to understand and utilize different biomolecules, nutrition, and nutritional support with special emphasis on parental nutrition. Students learn about specimen collection, and different laboratory apparatus used and reparation of solutions. They are exposed to the concept of quality control. They will perform routine urine and blood investigations and interpret and diagnose abnormalities.

2. Course Size and Credits:

Number of credits	02
Total hours of class room interaction during the semester	30
Number of practical/tutorial hours	00
Number of semester weeks	16
Department responsible	Allied Health Sciences
Course evaluation	Total Marks: 50
Pass requirement	As per academic regulations
Attendance requirement	As per academic regulations

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II. Teaching, Learning and Assessment

1. Course Outcomes (CO)

Upon completion of this course students will be able to:

No.	Course outcome
1.	Describe the various laboratory apparatus used, the steps in specimen collection and safety measurements to be taken in biochemistry laboratory
2.	Explain different models of atomic structure, acids, bases, buffers and disturbances in acid base balance
3.	Explain quality control, precision, specificity, sensitivity when conducting special investigations
4.	Demonstrate qualitative and quantitative estimations of various analyses (Urine, blood)
5.	Interpret the various biochemical parameters in health and disease

2. Course Contents:

Specimen collection Pre-analytical variables. Collection of blood. Collection of CSF & other fluids. Urine collection. Use of preservatives. Anticoagulants.
Introduction to laboratory apparatus Pipettes: different types (graduated, volumetric, Pasteur, automatic etc.).Calibration of glass pipettes. Burettes, beakers, petri dishes, depression plates. Flasks: different types (volumetric, round bottomed, Erlenmeyer conical etc.).Funnels: different types (conical, Buchner etc.).Bottles: reagent bottles – graduated and common, wash bottles different type specimen bottles
Instruments Use, care and maintenance of: water bath, oven & incubators, water distillation plant, water deionizers, refrigerators, cold box, deep freezers, reflux condenser, centrifuge, balances, colorimeter, spectrophotometer, pH meter and electrodes. Centrifuges: definition, principles, Svedberg unit, centrifugal force, centrifugal field, RPM, conversion of G to RPM and vice versa, different types of centrifuges. Manual balances: single pan, double pan, triple balance, direct read out electrical balances.
Safety of measurements & Conventional and SI units
Dilutions
Acids & Bases
Acid- base indicator Theory
Quality control

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3. Course Map (CO-PO-PSO Map)

	Programme Outcomes (POs)												Programme Specific Outcomes (PSOs)			
	PO -1	PO -2	PO -3	PO -4	PO -5	PO -6	PO -7	PO -8					PSO -1	PSO -2	PSO -3	PSO -4
CO-1		1	1		2								2			
CO-2					2								2			
CO-3	1				2								2			
CO-4	2				2								3			
CO-5	2				2								2			
CO-6	3				2								2			
3: Very Strong Contribution, 2: Strong Contribution, 1: Moderate Contribution																

4. Course Teaching and Learning Methods

Teaching and Learning Methods	Duration in hours	Total Duration in Hours
Face to Face Lectures		14
Demonstrations		
1. Demonstration using Videos		
2. Demonstration using Physical Models/ Systems		
3. Demonstration on a Computer		
Numeracy		
1. Solving Numerical Problems		
Practical Work		
1. Course Laboratory		
2. Computer Laboratory		
3. Engineering Workshop/Course Workshop/Kitchen		
4. Clinical Laboratory		
5. Hospital		
6. Model Studio		
Others		
1. Case Study Presentation	15	
2. Guest Lecture		
3. Industry/Field Visit	09	41
4. Brain Storming Sessions	05	
5. Group Discussions	11	
6. Discussing Possible Innovations	01	
Written Examination (Mid-Term tests and SEE)		05
Total Duration in Hours		60

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5. Method of Assessment

Continuous Evaluation Policies: Continuous evaluation depends on the type of the course as discussed below:

Theory Component CE			**Laboratory Component CE**	**SEE**
SC1 (Written Assignment)	SC2 (Innovative assignment)	SC3 (Mid-term test)	SC4 (Formative laboratory performance assessment)	SEE
20 Marks	20 Marks	20 Marks	30 Marks	60 (40 written exam;
				20 Viva-voce)

In CE there shall be four subcomponents of CE (SC1, SC2, SC3, and SC4), namely Mid Term; Written Assignment; Innovative assignments; and Laboratory performance assessment. Each subcomponent is evaluated individually accounting to 60% Weightage as indicated in Course Specifications. The innovative assignment subcomponents can be of any of the following types:

a) Online Test
b) Assignments/Problem Solving
c) Field Assignment
d) Open Book Test
e) Portfolio
f) Reports
g) Case Study
h) Group Task
i) Laboratory / Clinical Work Record
j) Computer Simulations
k) Creative Submission
l) Virtual Labs
m) Viva / Oral Exam
n) Lab Manual Report
o) Any other

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After the four subcomponents are evaluated, the CE component marks are consolidated to attain 60% Weightage. Laboratory/Practical shall be shifted as part of CE. The lab component as part of CE will have external examiner evaluation and marks listed separately for industry requirements. For a theory + laboratory course, the Semester End Examination shall be a 2-hour theory paper of 50 marks with a weightage of 40% and there will be a 20 marks Viva- Voce. In summary, the ratio of Formative (Continuous Evaluation-CE) Vs Summative (Semester End Examination-SEE) should be 60:40.

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6. Achieving learning outcomes

The following skills are directly or indirectly imparted to the students in the following teaching and learning methods:

S.No	Curriculum and Capabilities	How imparted during the course
1.	Knowledge	Class room lectures
2.	Understanding	Class room lectures
3.	Critical Skills	Class room lectures
4.	Analytical Skills	Group discussion
5.	Problem Solving Skills	Case discussions
6.	Practical Skills	Case discussions
7.	Group Work	case study and group discussions
8.	Self-Learning	Seminars
9.	Written Communication Skills	Examination
10.	Verbal Communication Skills	Group discussions
11.	Presentation Skills	Seminars, Case discussions
12.	Behavioral Skills	Group discussion, Case discussions
13.	Information Management	Case discussions
14.	Leadership Skills	Group discussions

III. Course Resources

1. Essential Reading

- Vasudevan, D.M., Sreekumari, S., Vaidyanathan, K. Textbook of Biochemistry for Medical Students, Jaypee Brothers Medical Publishers, New Delhi, 8th Ed, 2016
- Satyanarayana U, Chakrapani U. Biochemistry. Books & Allied (P) Ltd, Kolkata 4th Ed, 2013

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2. Recommended Reading

- Murray Rk, GrannerDk, RochwellVw. Harper's Illustrated Biochemistry, Lange McGraw Hill, New York, 30th Ed, 2015
- Champe Pc, Harvey Ra, Ferrier Dr. Lippincott's Illustrated Reviews Biochemistry, Wolters Kluwer Health, Lippincotts Williams & Wilkins, New Delhi, 6th Ed, 2013
- DasDebjyoti, Fundamentals of Biochemistry books & allied, Kolkata 14th Ed, 2012
- Varley, Clinical chemistry 4th edition
- Teitz, Fundamentals of clinical chemistry 6th edition

3. Magazines and Journals

- Public Health Nutrition
- Journal of clinical chemistry and laboratory medicine
- Indian journal of medical biochemistry

4. Websites

IV. Course Organization

Course Title		General Biochemistry
Course Code		AHD107A
Course Leader/s Name		
Course Leader Contact Details	**Phone:**	080 – 49065555
	E- mail:	
Course Specifications Approval		June 2022
Next Course Specifications Review		June 2026

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Course Specifications: General Pharmacology

Course Title	General Pharmacology
Course Code	AHD108A
Department	Allied Health Sciences
Faculty	Faculty of Life and Allied Health Sciences

I. Course Summary

1. Aim and Summary

The aim of the course is to introduce students of allied health sciences to the Pharmacological basis of therapeutics. This should help them to understand therapeutics in management of various diseases.

Pharmacology, the science of drugs, has special reference to the students of allied health sciences. Practice of various technologies involves use of pharmacological agents both for diagnosis and treatment. The students are oriented to importance of pharmacological basis of therapeutic intervention. Broad understanding of pharmacology with emphasis on how human body handles a drug is imperative to these students.

2. Course Size and Credits:

Number of credits	02
Total hours of class room interaction during the semester	30
Number of practical/tutorial hours	00
Number of semester weeks	16
Department responsible	Allied Health Sciences
Course evaluation	Total Marks: 50
Pass requirement	As per academic regulations
Attendance requirement	As per academic regulations

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II. Teaching, Learning and Assessment

3. Course Outcomes (CO)

Upon completion of this course students will be able to:

No.	Course Outcome
1	Describe pharmacokinetic principles in relation to drug administration
2	Explain the concept of pharmacodynamics in relation to drug utilization in therapeutics
3	Explain the concept of chemotherapy in relation to infectious diseases
4	Explain the importance of adverse effects in therapeutics of various drug usage
5	Identify drugs dosage forms and posology in management of diseases and calculate doses in various age groups
6	Interpret the importance of drug combinations with reference to therapeutic index and drug utilization

4. Course Contents

General Pharmacology Introduction to pharmacology-various terminologies-sources & routes of drug administration – Absorption & Factors modifying drug absorption – Distribution of drugs – Metabolism: Phase II, - Excretion: routes, modes & kinetics of elimination –Excretion – Mechanism of drug action in brief, synergism & antagonism and Factorsmodifying drug action – Adverse drug reactions – ADR reporting & monitoring – Drug interactions
Pharmacokinetics Pharmacokinetics and dynamics of drugs acting on Central Nervous System &Respiratory System Introduction to CNS and Neurotransmitters, drugs used in insomnia, Sedatives and hypnotics
Safety and efficacy of drugs acting on Cardio vascular system & blood. Drugs used in ischemic heart disease-nitrates-Calcium channel, immunomodulators, hormones
Drug use in children and geriatric population with reference to antimicrobials.

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5. Course Map (CO-PO-PSO Map) RM

	Programme Outcomes (POs)												Programme Specific Outcomes (PSOs)			
	PO -1	PO -2	PO -3	PO -4	PO -5	PO -6	PO -7	PO -8					PSO -1	PSO -2	PSO -3	PSO -4
CO-1	2			2	2								2			
CO-2	2			1	2								2			
CO-3	2				2								2			
CO-4	3				2			1					3			1
CO-5	2				2			1					2			1
	2			1	1								2			
3: Very Strong Contribution, 2: Strong Contribution, 1: Moderate Contribution																

6. Course Teaching and Learning Methods

Teaching and Learning Methods	Duration in hours	Total Duration in Hours
Face to Face Lectures		25
Demonstrations		5
1. Demonstration using Videos	5	
2. Demonstration using Physical		
3. Demonstration on a Computer		
Numeracy		
1. Solving Numerical Problems		
PracticalWork		
1. Course Laboratory		
2. Computer Laboratory		
3. Engineering Workshop/Course Workshop/Kitchen		
4. Clinical Laboratory		
5. Hospital		
6. Model Studio		
Others		
1. Case Study Presentation		
2. Guest Lecture		
3. Industry/Field Visit		
4. Brain Storming Sessions		
5. Group Discussions		
6. Discussing Possible Innovations		
Written Examination (Term tests and SEE)		05
Total Duration in Hours		35

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7. Method of Assessment

Continuous Evaluation Policies: Continuous evaluation depends on the type of the course as discussed below:

Theory Component CE			**Laboratory Component CE**	**SEE**
SC1 (Written Assignment)	SC2 (Innovative assignment)	SC3 (Mid-term test)	SC4 (Formative laboratory performance assessment)	SEE
20 Marks	20 Marks	20 Marks	30 Marks	60 (40 written exam;
				20 Viva-voce)

In CE there shall be four subcomponents of CE (SC1, SC2, SC3, and SC4), namely Mid Term; Written Assignment; Innovative assignments; and Laboratory performance assessment. Each subcomponent is evaluated individually accounting to 60% Weightage as indicated in Course Specifications. The innovative assignment subcomponents can be of any of the following types:

a) Online Test
b) Assignments/Problem Solving
c) Field Assignment
d) Open Book Test
e) Portfolio
f) Reports
g) Case Study
h) Group Task
i) Laboratory / Clinical Work Record
j) Computer Simulations
k) Creative Submission
l) Virtual Labs
m) Viva / Oral Exam
n) Lab Manual Report
o) Any other

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After the four subcomponents are evaluated, the CE component marks are consolidated to attain 60% Weightage. Laboratory/Practical shall be shifted as part of CE. The lab component as part of CE will have external examiner evaluation and marks listed separately for industry requirements. For a theory + laboratory course, the Semester End Examination shall be a 2-hour theory paper of 50 marks with a weightage of 40% and there will be a 20 marks Viva- Voce. In summary, the ratio of Formative (Continuous Evaluation-CE) Vs Summative (Semester End Examination-SEE) should be 60:40.

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Approved by the Academic Council at its 26th meeting held on 14 July 2022

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8. Achieving learning outcomes

The following skills are directly or indirectly imparted to the students in the following teaching and learning methods

S.No	Curriculum and Capabilities Skills	How imparted during the course
1.	Knowledge	Class room lectures
2.	Understanding	Class room lectures
3.	Critical Skills	Class room lectures
4.	Analytical Skills	Group discussion
5.	Problem Solving Skills	Case discussions
6.	Practical Skills	Case discussions
7.	Group Work	case study and group discussions
8.	Self-Learning	Seminars
9.	Written Communication Skills	Examination
10.	Verbal Communication Skills	Group discussions
11.	Presentation Skills	Seminars, Case discussions
12.	Behavioral Skills	Group discussion, Case discussions
13.	Information Management	Case discussions
14.	Leadership Skills	Group discussions

III. Course Resources

1. Essential Reading

- Essentials of Medical Pharmacology: K.D. Tripathi, 6th edition, Jaypee Publishers
- Medical Pharmacology. S K Shrivastava. Avichal publishing NewDelhi
- Manual of Practical Pharmacology. Avichal Publications.

2. Recommended Reading

- Lippincott's Illustrated Reviews: Pharmacology, 5th edition, by Richard A. Harvey and Pamela C. Champe, Lippincott Williams & Wilkins Publisher
- Katzung's Basic and Clinical Pharmacology 13th edition. Lange Publication.

3. Magazines and Journals

4. Websites:

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IV. Course Organization

Course		General Pharmacology
Course		AHD108A
Course Leader/s Name		
Course Leader Contact Details	**Phone:**	080 – 49065555
	E- mail:	
Course Specifications Approval		
Next Course Specifications Review		

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Course Specifications: Concepts of Hospital infection prevention

Course Title	Concepts of Infection Prevention
Course Code	AHD109A
Department	Allied Health Sciences
Faculty	Life and Allied Health Sciences

I. Course Summary

1. Aim and Summary

The aim of the course is to help students understand the basic concepts of quality in health Care and develop skills to implement prevention of infection spreading in the health system.

The students will be introduced to aspects such as Bio medical waste management and environment safety, Infection prevention and control, Antibiotic Resistance and Disaster preparedness and management.

2. Course Size and Credits:

Number of credits	03
Total hours of class room interaction during the semester	30
Number of practical/tutorial hours	15
Number of semester weeks	16
Department responsible	Allied Health Sciences
Course evaluation	Total Marks: 100
Pass requirement	As per the Academic Regulations
Attendance requirement	As per the Academic Regulations

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II. Teaching, Learning and Assessment

1. Course Outcomes (CO)

Upon completion of this course students will be able to:

No.	Course Outcomes
1.	Explain the steps involved in infection prevention and control
2.	Understand the working and application of CSSD
3.	Explain the importance of antibiotic resistance in the patient care and ways to prevent it.
4.	Apply the concepts of biomedical waste management to ensure clean and hazard free hospitalenvironment

2. Course Contents:

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)
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 aneffective infection control program and Guidelines (NABH and JCI) for Hospital Infection Control. Spill management
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. Antimicrobial stewardship-Barriers and opportunities. Tools and models in hospitals.
Working of CSSD: Understand the concepts of sterilization, disinfection in CSSD, Structure and workingof CSSD

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3. Course Map (CO-PO-PSO Map)

	Programme Outcomes (POs)												Programme SpecificOutcomes (PSOs)			
	PO-1	PO-2	PO-3	PO-4	PO-5	PO-6	PO-7	PO-8					PSO-1	PSO-2	PSO-3	PSO-4
CO-1				3			3						3		1	
CO-2				1	3		1						3			
CO-3				1	3		1						3			
CO-4					3		1						3			
3: Very Strong Contribution, 2: Strong Contribution, 1: Moderate Contribution																

4. Course Teaching and Learning Methods

Teaching and Learning Methods	Duration in hours	Total Duration in Hours
Face to Face Lectures		20
Demonstrations		2
7. Demonstration using Videos	2	
2. Demonstration using Physical Models/ Systems		
3. Demonstration on a Computer		
Numeracy		
1. Solving Numerical Problems		
Practical Work		8
1. Course Laboratory	15	
2. Computer Laboratory		
3. Engineering Workshop/Course Workshop/Kitchen		
4. Clinical Laboratory	5	
5. Hospital	5	
6. Model Studio		
Others		
1. Case Study Presentation	2	
2. Guest Lecture		
3. Industry/Field Visit		
4. Brain Storming Sessions	3	
5. Group Discussions	10	
6. Discussing Possible Innovations		
7. Journal club		
Written Examination (Mid-Term tests and SEE)		8
Total Duration in Hours		38

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5. Method of Assessment

Continuous Evaluation Policies: Continuous evaluation depends on the type of the course as discussed below:

Theory Component CE			Laboratory Component CE	SEE
SC1 (Written Assignment)	SC2 (Innovative assignment)	SC3 (Mid-term test)	SC4 (Formative laboratory performance assessment)	SEE
20 Marks	20 Marks	20 Marks	30 Marks	60 (40 written exam;
				20 Viva-voce)

In CE there shall be four subcomponents of CE (SC1, SC2, SC3, and SC4), namely Mid Term; Written Assignment; Innovative assignments; and Laboratory performance assessment. Each subcomponent is evaluated individually accounting to 60% Weightage as indicated in Course Specifications. The innovative assignment subcomponents can be of any of the following types:

a) Online Test
b) Assignments/Problem Solving
c) Field Assignment
d) Open Book Test
e) Portfolio
f) Reports
g) Case Study
h) Group Task
i) Laboratory / Clinical Work Record
j) Computer Simulations
k) Creative Submission
l) Virtual Labs
m) Viva / Oral Exam
n) Lab Manual Report
o) Any other

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After the four subcomponents are evaluated, the CE component marks are consolidated to attain 60% Weightage. Laboratory/Practical shall be shifted as part of CE. The lab component as part of CE will have external examiner evaluation and marks listed separately for industry requirements. For a theory + laboratory course, the Semester End Examination shall be a 2-hour theory paper of 50 marks with a weightage of 40% and there will be a 20 marks Viva- Voce. In summary, the ratio of Formative (Continuous Evaluation-CE) Vs Summative (Semester End Examination-SEE) should be 60:40.

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6. Achieving learning outcomes

The following skills are directly or indirectly imparted to the students in the following teaching and learning methods:

S.No	Curriculum and Capabilities	How imparted during the course
1.	Knowledge	Class room lectures
2.	Understanding	Class room lectures
3.	Critical Skills	Class room lectures
4.	Analytical Skills	Group discussion
5.	Problem Solving Skills	Case discussions
6.	Practical Skills	Case discussions
7.	Group Work	case study and group discussions
8.	Self-Learning	Seminars
9.	Written Communication Skills	Examination
10.	Verbal Communication Skills	Group discussions
11.	Presentation Skills	Seminars, Case discussions
12.	Behavioral Skills	Group discussion, Case discussions
13.	Information Management	Case discussions
14.	Leadership Skills	Group discussions

III. Course Resources

1. Essential Reading

- Class notes
- Essentials of Hospital Infection Control by Apurba Shastry

2. Recommended Reading

3. Magazines and Journals

4. Websites

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IV. Course Organization

Course Code		AHD109A
Course Title		Concepts of Infection Prevention
Course Leader/Name		As per time table
Course Leader Contact Details	**Phone:**	080 – 49065555
	E- mail:	
Course Specifications Approval Date		10/5/2019
Next Course Specifications Review Date:		10/5/2023

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Course Specifications: **General Pathology**

Course Title	General Pathology
Course Code	AHD110A
Department	Allied Health Science
Faculty	Faculty of Life and Allied Health Sciences

I. Course Summary

1. Aim and Summary

The aim of the course is to introduce students of allied health sciences to concepts of general Pathology. This should help them to build a foundation for understanding pathological basis of various diseases with special reference to radiation technology and dialysis technology. The course would help integrate knowledge of basic concepts of pathology and clinical medicine into allied sciences. At the end of the course, the student will learn fundamental aspects of cellular injury, inflammation, tissue repair, immunology, neoplasia, histopathology, hematology and blood banking

2. Course Size and Credits:

Number of credits	03
Total hours of class room interaction during the semester	30
Number of practical/tutorial hours	15
Number of semester weeks	16
Department responsible	Allied Health Sciences
Course evaluation	Total Marks: 50
Pass requirement	As per the Academic Regulations
Attendance requirement	As per the Academic Regulations

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II. Teaching, Learning and Assessment

1. Course Outcomes (CO)

Upon completion of this course students will be able to:

No.	Course Outcome
1.	Describe basic facts and concepts of pathology
2.	Explain fundamental aspects of hematology and blood banking
3.	Explain the various clinical pathology tests
4.	Perform laboratory tests related to hematology and clinical pathology
5.	Interpret the results of laboratory tests
6.	Apply concepts of general pathology to understand pathological basis of

2. Course Contents:

General Pathology

General Pathology Adaptations, Cell Injury and Repair: Hyperplasia, atrophy, metaplasia, necrosis and apoptosis - Differences between apoptosis and necrosis.

Acute and Chronic inflammation: Five cardinal signs of inflammation- Outcomes of acute inflammation- Chronic inflammation-Granulomatous inflammation-Acute phase proteins.

Tissue repair, regeneration and hemodynamic disorders: Cutaneous wound healing-Pathologic aspects of repair-Hyperaemia and congestion-Thrombosis and Virchow triad-Embolism-Infarction Shock; Bronchial asthma, COPD.

Diseases of immune system: Hypersensitivity reaction-Type I, II, III, and IV hypersensitivity reactions.

Neoplasia: Definition of neoplasia. Differences between benign and malignant tumors ; Metastasis ; Carcinogenesis – Causes ; Carcinoma of oral cavity – Causes; Etiology of Carcinoma cervix – type of virus implicated, high risk sero-types, Screening investigations; Breast carcinoma – Risk factors

Histopathology

Introduction to histopathology. Receiving of specimen in the laboratory. Grossing techniques. Mounting techniques: various mountants. Maintenance of records and filing of the slides. Use& care of microscope. Various fixatives, mode of action, preparation and indication. Sectioncutting. Tissue processing for routine paraffin sections. Decalcification of tissues. Staining of tissues: H & E Staining. Bio- medical waste management. Frozen section cutting and staining.

Blood Bank

Introduction. Blood grouping and Rh types. Cross matching

Laboratory

ine Examination: physical, chemical, microscopic.

Blood grouping Rh typing. Cross matching (Observation), how to send samples for cross matching, PT, APTT and Hb, packed cell volume (PCV), erythrocyte sedimentation rate (ESR), bleeding tome, clotting time

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3. Course Map (CO-PO-PSO Map)

	Programme Outcomes (POs)												Programme Specific Outcomes (PSOs)			
	PO -1	PO -2	PO -3	PO -4	PO -5	PO -6	PO -7	PO -8					PSO -1	PSO -2	PSO -3	PSO -4
CO-1	1				1								2			
CO-2	1		1	1									2			
CO-3	2				2								2			
CO-4	2		1		2								2			
CO-5	2			1									2			
CO-6	2		1		2			1					2		1	
3: Very Strong Contribution, 2: Strong Contribution, 1: Moderate Contribution																

4. Course Teaching and Learning Methods

Teaching and Learning Methods	Duration in hours	Total Duration in Hours
Face to Face Lectures		25
Demonstrations		
1. Demonstration using Videos		
2. Demonstration using Physical	05	
3. Demonstration on a Computer		
Practical Work		
Conducting demo interviews and focus	15	
Computer lab (software demonstration)		
Demonstrating analysis using a case study		
Others		
1. Case Study Presentation		
2. Brain Storming Sessions		
3. Group Discussions		
4. Discussing Possible Innovations		
Written Examination		10
Total Duration in Hours		55

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5. Method of Assessment

Continuous Evaluation Policies: Continuous evaluation depends on the type of the course as discussed below:

Theory Component CE			Laboratory Component CE	SEE
SC1 (Written Assignment)	SC2 (Innovative assignment)	SC3 (Mid-term test)	SC4 (Formative laboratory performance assessment)	SEE
20 Marks	20 Marks	20 Marks	30 Marks	60 (40 written exam;
				20 Viva-voce)

In CE there shall be four subcomponents of CE (SC1, SC2, SC3, and SC4), namely Mid Term; Written Assignment; Innovative assignments; and Laboratory performance assessment. Each subcomponent is evaluated individually accounting to 60% Weightage as indicated in Course Specifications. The innovative assignment subcomponents can be of any of the following types:

a) Online Test
b) Assignments/Problem Solving
c) Field Assignment
d) Open Book Test
e) Portfolio
f) Reports
g) Case Study
h) Group Task
i) Laboratory / Clinical Work Record
j) Computer Simulations
k) Creative Submission
l) Virtual Labs
m) Viva / Oral Exam
n) Lab Manual Report
o) Any other

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After the four subcomponents are evaluated, the CE component marks are consolidated to attain 60% Weightage. Laboratory/Practical shall be shifted as part of CE. The lab component as part of CE will have external examiner evaluation and marks listed separately for industry requirements. For a theory + laboratory course, the Semester End Examination shall be a 2-hour theory paper of 50 marks with a weightage of 40% and there will be a 20 marks Viva- Voce. In summary, the ratio of Formative (Continuous Evaluation-CE) Vs Summative (Semester End Examination-SEE) should be 60:40.

6. Achieving learning outcomes

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The following skills are directly or indirectly imparted to the students in the following teaching and learning methods:

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S.No	Curriculum and Capabilities	How imparted during the course
1.	Knowledge	Class room lectures
2.	Understanding	Class room lectures
3.	Critical Skills	Class room lectures
4.	Analytical Skills	Group discussion
5.	Problem Solving Skills	Case discussions
6.	Practical Skills	Case discussions
7.	Group Work	case study and group discussions
8.	Self-Learning	Seminars
9.	Written Communication Skills	Examination
10.	Verbal Communication Skills	Group discussions
11.	Presentation Skills	Seminars, Case discussions
12.	Behavioral Skills	Group discussion, Case discussions
13.	Information Management	Case discussions
14.	Leadership Skills	Group discussions

III. Course Resources

1. Essential Reading

- Sood R, (1996), Laboratory Technology- Methods and interpretation, 4th Ed. J.P. Bros, New Delhi.
- Nayak R, (2017), Textbook of Pathology for Allied Health sciences, Jaypee brothers Medical Publishers,New Delhi.
- MdTahmiunur Rahman Sajal et al, (2013), A Short Textbook of Pathology, 2nd Ed, Jaypee,New Delhi

IV. Course Organization

Course		General Pathology
Course		AHD110A
Course Leader/s Name		
Course Leader Contact Details	**Phone:**	080 – 49065555
	E- mail:	
Course Specifications Approval		
Next Course Specifications Review		

Approved by the Academic Council at its 26th meeting held on 14 July 2022

Course Specifications: Directed clinical education – I

Course Title	Directed clinical education – I
Course Code	AHD112A
Department	Allied Health Sciences
Faculty	Life and Allied Health Sciences

I. Course Summary

1. Aim and Summary

The aim is to expose the students in a social or clinical context that enhances learning of health, illness or disease, and the role of the allied health professional.

The students are taken to the hospital "wards/clinics" and made to understand the protocols and patterns to enhance their skills and understand diseases and ailments..

2. Course Size and Credits:

Number of credits	10
Total hours of class room interaction during the semester	
Number of practical/tutorial hours	300
Number of semester weeks	16
Department responsible	Allied Health Sciences
Course evaluation	Total Marks: 100
Pass requirement	As per the Academic Regulations
Attendance requirement	As per the Academic Regulations

II. Teaching, Learning and Assessment

1. Course Outcomes (CO)

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Upon completion of this course students will be able to:

No.	Intended Learning Outcomes
1.	Describe the movement of patient from the point of entry into the hospital till treatment
2.	Describe the role of nursing in patient care
3.	Explain the importance of inter professional team approach to patient care

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4.	Demonstrate bed making, lifting and transport of patients
5.	Assist in bed side management of patient in the wards OT and Out patient
6.	Assist in changing surgical dressings and collection of samples for Lab Tests

2. Course Contents:

Course Content
1. Introduction to Hospital- Registration record keeping OPD Laboratories andWards
2. Introduction to Nursing- Nursing principles, Nursing care, Bed Making ,Liftingof and transport of patients from bed to wheel chair and from bed to stretcher
3. Bed side management Giving and taking Bed Pan, urinal, sputum tray . Observation of stool urine and sputum. Observe the use and care of catheters andenema procedure
4. Method of giving nourishment. Feeding, Tube feeding, drips transfusion
5. Surgical dressing. Simple aseptic precautions, dressing procedures.
6. Introduction to operation theater outlay. Preoperative, intraoperative and post-operative areas
7. Introduction to dialysis unit including patient care and equipment.
8. Introduction to department of radio diagnosis and various sub units such as X ray Doppler Ultra sonography CT MRI

3. Course Map (CO-PO-PSO Map)

	Programme Outcomes (POs)												Programme Specific Outcomes (PSOs)			
	PO-1	PO-2	PO-3	PO-4	PO-5	PO-6	PO-7	PO-8	PO-9	PO-10	PO-11	PO-12	PSO-1	PSO-2	PSO-3	PSO-4
CO-1	3							2					2			3
CO-2	3							2					2			3
CO-3	3							2					2			3
CO-4	3							2					2	1		3
CO-5	3							2					2			3
CO-6	3	1					1	2					2			3
3: Very Strong Contribution, 2: Strong Contribution, 1: Moderate Contribution																

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4. Course Teaching and Learning Methods

Teaching and Learning Methods	Duration in hours	Total Duration in Hours
Face-to-Face Lectures		
Demonstrations		10
4. Demonstration using Videos		
2. Demonstration using Physical Models/ Systems	10	
3. Demonstration on a Computer		
Numeracy		
1. Solving Numerical Problems		
Practical Work		270
1. Course Laboratory		
2. Computer Laboratory		
3. Engineering Workshop/Course Workshop/Kitchen		
4. Clinical Laboratory	100	
5. Hospital	170	
6. Model Studio		
Others		10
1. Case Study Presentation	5	
2. Guest Lecture		
3. Industry/Field Visit		
4. Brain Storming Sessions	5	
5. Group Discussions		
6. Discussing Possible Innovations		
Written Examination (Mid-Term tests and SEE)		10
Total Duration in Hours		300

5. Method of Assessment

There are two components for assessment in this Course

Component- 1: 60% weight

Group activity/Case study

Component- 2: 40% weight

Evaluation/MCQs/Report

The assessment questions are set to test the learning outcomes. In each component, certain learning outcomes are assessed. The following table illustrates the focus of learning outcome in each component assessed:

No.	Intended Learning Outcome	Mode of Assessment

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		Component 1 (CE)	Component 2 (SEE)
1	Understand the basics of qualitative research	X	X
2	Explain different methods of qualitative research including overview of phenomenology and ethnography approaches	X	X
3	Apply techniques of data analysis and interpretation using QDA miner lite -2	X	X
4	Develop skills to write a report based on the qualitative data analysis	X	X

The Course Leader assigned to the course, in consultation with the Head of the Department, shall provide the focus of COs in each component of assessment in the above template at the beginning of the semester.

Course reassessment policies are presented in the Academic Regulations document.

6. Achieving learning outcomes

The following skills are directly or indirectly imparted to the students in the following teaching and learning methods:

S.No	Curriculum and Capabilities	How imparted during the course
1.	Knowledge	Class room lectures
2.	Understanding	Class room lectures
3.	Critical Skills	Case study and group discussions
4.	Analytical Skills	Group discussion
5.	Problem Solving Skills	Case discussions
6.	Practical Skills	Case discussions
7.	Group Work	Case study and group discussions
8.	Self-Learning	Assignments/Reports
9.	Written Communication Skills	Examination
10.	Verbal Communication Skills	Group discussions
11.	Presentation Skills	Case discussions
12.	Behavioral Skills	Group discussion, Case discussions
13.	Information Management	Case discussions
14.	Leadership Skills	Group discussions

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III. Course Resources

1. Essential Reading
2. Recommended Reading
3. Magazines and Journals

IV. Course Organization

Course		AHD112A
Course		Directed Clinical Education I
Course Leader/s Name		
Course Leader Contact Details	**Phone:**	080 – 49065555
	E- mail:	
Course Specifications Approval		
Next Course Specifications Review		

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DIALYSIS THERAPY TECHNOLOGY (DTT) 2022-2026

SEMESTER 3

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Course Specifications: BASIC CONCEPTS IN RENAL DISEASES

Course Title	Basic concepts in renal diseases
Course Code	DTC201A
Department	Allied Health Science
Faculty	Faculty of Life and Allied Health Sciences

V. Course Summary

1. Aim and Summary

The course aims to provide information about the basic concepts of renal diseases in adults and children, including the pregnancy associated renal diseases. Course gives an overviewof the different types of renal diseases that emphasis on the caustic, risk factors and the manifestations acute and chronic renal diseases in both adults and children

2. Course Size and Credits:

Number of credits	3
Total hours of class room interaction during the semester	45
Number of practical/tutorial hours	
Number of semester weeks	16
Department responsible	Allied Health Sciences
Course evaluation	Total Marks: 100
Pass requirement	As per the Academic Regulations
Attendance requirement	As per the Academic Regulations

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VI. Teaching, Learning and Assessment

1. Course Outcomes (CO)

Upon completion of this course students will be able to:

No.	Course Outcomes
1.	Describe the basic concepts of renal diseases in adults and children, congenital and inherited diseases
2.	Describe the basic concepts in pregnancy-associated renal diseases and tumors
3.	Explain the different types of renal diseases in acute and chronic kidney diseases
4.	Explain the urinary tract infection how it will affect to the kidney
5.	Explain the normal and diseased renal changes
6.	Describe the conservative care in AKI and CKD

2. Course Contents:

Basic Concepts of Renal Diseases

- Acute renal failure.
- Nephrotic syndrome – primary & secondary.
- Nephritic syndrome.
- UTI (urinary tract infections.)
- Asymptomatic urinary abnormalities.
- Chronic renal failure.
- Disorders of body fluids
- Renal stone diseases.
- Obstructive uropathies
- Congenital & inherited renal diseases.
- Tumors of kidney.
- Pregnancy associated renal diseases.
- Hematologic aspects of kidney diseases
- Pathophysiology of uremia
- Endocrine aspects of chronic kidney disease
- Neurologic aspects of kidney disease
- Renal vascular disorders & hypertension associated renal diseases.
- Conservative management of kidney disease
- Mineral bone disorder
- Drug Dosing Considerations in Patients with Acute Kidney Injury and ChronicKidney Disease

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3. Course Map (CO-PO-PSO Map)

	Programme Outcomes (POs)												Programme Specific Outcomes (PSOs)			
	PO -1	PO -2	PO -3	PO -4	PO -5	PO -6	PO -7	PO -8	PO -9	PO -10	PO -11	PO -12	PSO -1	PSO -2	PSO -3	PSO -4
CO-1	2												2			
CO-2	2												2			
CO-3	2				1		2						2	2		1
CO-4	2							2					2	2		
CO-5	2		2		1		1	3					2	3	1	1
CO-6	2		1		1			1					2	3	1	
3: Very Strong Contribution, 2: Strong Contribution, 1: Moderate Contribution																

4. Course Teaching and Learning Methods

Teaching and Learning Methods	Duration in hours	Total Duration in Hours
Face to Face Lectures		40
Demonstrations		
8. Demonstration using Videos		
2. Demonstration using Physical Models/ Systems		
3. Demonstration on a Computer		
Numeracy		
1. Solving Numerical Problems		
Practical Work		
1. Course Laboratory		
2. Computer Laboratory		
3. Engineering Workshop/Course Workshop/Kitchen		
4. Clinical Laboratory		
5. Hospital		
6. Model Studio		
Others		
1. Case Study Presentation		
2. Guest Lecture		
3. Industry/Field Visit		
4. Brain Storming Sessions		
5. Group Discussions		
6. Discussing Possible Innovations		
Written Examination (Mid-Term tests and SEE)		05
Total Duration in Hours		45

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5. Method of Assessment

The following is the CE components:

Theory Course CE			Theory Course SEE
SC1 (Written Assignment)	SC2 (Assignment)	SC3 (Mid-term test)	40 marks
20 marks	20 Marks	20 Marks	

In CE there shall be three subcomponents of CE (SC1, SC2, and SC3), namely Mid Term; Written Assignment; Innovative assignments. Each subcomponent is evaluated individually accounting to 60% Weightage as indicated in Course Specifications. The innovative assignment subcomponents can be of any of the following types:

a) Online Test
b) Assignments/Problem Solving
c) Field Assignment
d) Open Book Test
e) Portfolio
f) Reports
g) Case Study
h) Group Task
i) Laboratory / Clinical Work Record
j) Computer Simulations

Creative Submissionaa) Virtual Labs
bb) Viva / Oral Exam cc) Lab Manual Reportdd) Any other

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After the three subcomponents are evaluated, the CE component marks are consolidated to attain 60% Weightage.

The Semester End Examination shall be a 2-hour theory paper of 50 marks with a weightage of 40% in case of theory
courses. In summary, the ratio of Formative (Continuous Evaluation-CE) Vs Summative (Semester End Examination-SEE)
should be 60:40.

6. Achieving learning outcomes

The following skills are directly or indirectly imparted to the students in the following teaching and learning methods:

S.No	Curriculum and Capabilities	How imparted during the course
1.	Knowledge	Class room lectures
2.	Understanding	Class room lectures
3.	Critical Skills	Class room lectures

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4.	Analytical Skills	Group discussion
5.	Problem Solving Skills	Case discussions
6.	Practical Skills	Case discussions
7.	Group Work	case study and group discussions
8.	Self-Learning	Seminars
9.	Written Communication Skills	Examination
10.	Verbal Communication Skills	Group discussions
11.	Presentation Skills	Seminars, Case discussions
12.	Behavioral Skills	Group discussion, Case discussions
13.	Information Management	Case discussions
15.	Leadership Skills	Group discussions

VII. Course Resources

1. Essential Reading

- Concepts of renal diseases and its management- Dr.Renuka
- BRENNER & RECTOR'S THE KIDNEY

2. Recommended Reading

- Mitchell. Introduction to Health Care. 4th Ed. Cengage Publications
- Concepts of renal diseases and its management- Dr.Renuka
- BRENNER & RECTOR'S THE KIDNEY
- Chronic Kidney Disease, Dialysis, and Transplantation Companion to Brenner &Rector's The Kidney-Third Edition

3. Magazines and Journals

- Journal of Renal disorders and management
- https://www.ajkd.org/

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4. Websites

- https://www.niddk.nih.gov/-/media/Files/Health-Information/Communication-Programs/NKDEP/Renal_Fall10_Advances_508.pdf?la=en
- https://emedicine.medscape.com/article/238798-overview
- Access Medicine e-Books www.accessmedicine.com
- Annual Reviews Biomedical Science Collection
- http://www.annualreviews.org/
- Nature Online http://www.nature.com/nature/index.html
- Emerald www.emeraldinsight.com

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VIII. Course Organization

Course		DTC201A
Course		Basic concepts in renal diseases
Course Leader/s Name		
Course Leader Contact Details	**Phone:**	080 – 49065555
	E- mail:	
Course Specifications Approval		
Next Course Specifications Review		

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Course Specifications: Applied pharmacology related to dialysis

Course Title	Applied Pharmacology Related to Dialysis
Course Code	DTC202A
Department	Allied Health Science
Faculty	Faculty of Life and Allied Health Sciences

I. Course Summary

1. Aim and Summary

The aim of the course is to introduce students of dialysis technology the role of Pharmacological agents in the outcome of renal therapeutics. Renal diseases can come in the way of management of various diseases by pharmacological interventions, this need tobe understood by these students.

The students are oriented to importance of pharmacogical principles of drug therapy. Thestudents are exposed to drugs acting on various systems in the body. They will know the importance of care to be taken during drug interventions in renal diseases. Drugs which themselves can lead to renal diseases will be discussed in this course. Drugs which needtherapeutic monitoring in renal patients are discussed.

2. Course Size and Credits:

Number of credits	02
Total hours of class room interaction during the semester	30
Number of practical/tutorial hours	
Number of semester weeks	
Department responsible	Allied Health Sciences
Course evaluation	Total Marks: 100
Pass requirement	As per the Academic Regulations
Attendance requirement	As per the Academic Regulations

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II. Teaching, Learning and Assessment

1. Course Outcomes (CO)

Upon completion of this course students will be able to:

No.	Course Outcomes
1.	Describe Concepts of the interactions of chemical agents with living tissues, effect of drugs on the body, drugs and alteration of disease processes,toxicity effects.
2.	Explain Drug use in renal disease, drugs in special populations pharmacokinetics, drug interactions,
3.	Explain pharmacology of drugs affecting blood and blood coagulation
4.	Discuss the importance of plasma expanders in the management of renal diseases.
5.	Discuss role of diuretics in management of renal illness.
6.	Apply the pharmacological concepts to prepare dialysis fluids and their complications.

2. Course Contents:

Course Content
1. Introduction to drug therapy. a. IV fluid therapy with special emphasis in renal diseases. b. Anti-hypertensives: classification, actions, dosage, side effects & contraindications, special reference during dialysis, vasopressors, drugs used in hypotension. c. Drugs & dialysis: dose & duration of administration of drugs d. Dialyzable drugs: phenobarbitone, lithium, methanol etc. e. Antibiotics f. Immunosuppressant's
2. Vitamin D & its analogues, phosphate binders, iron, folic acid & other vitamins of therapeutic value.
3. Erythropoietin in detail. Heparin, low molecular weight heparin and heparin-induced thrombocytopenia. Importance of pharmacodynamics in therapeutics.
4. Heparin . Protamine sulphate as antidote and indication. Alternative anticoagulants. Formalin, citrate, sodium hypochlorite, hydrogen peroxide: role as disinfectants &adverse effects of residual particles applicable to formalin. Roll of plasma expanders and importance of drug interactions.

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5. Role of Diuretics: classification, actions, dosage, side effects & contraindications. Potassium exchange resins with special emphasis on mode of administration.
6. Hemodialysis concentrates: composition & dilution (acetate & bicarbonates).Peritoneal dialysis fluid in particular hypertonic solutions: composition. 7. Vaccination in CKD

3. Course Map (CO-PO-PSO Map)

	Programme Outcomes (POs)												Programme Specific Outcomes (PSOs)			
	PO -1	PO -2	PO -3	PO -4	PO -5	PO -6	PO -7	PO -8	PO -9	PO -10	PO -11	PO -12	PSO -1	PSO -2	PSO -3	PSO -4
CO-1	3		1										1			
CO-2		1	1										1			
CO-3	1		1		1								1			
CO-4			1										1			
CO-5	1		1										1			
CO-6	3		1										1			
3: Very Strong Contribution, 2: Strong Contribution, 1: Moderate Contribution																

4. Course Teaching and Learning Methods

Teaching and Learning Methods	Duration in hours	Total Duration in Hours
Face to Face Lectures		25
Demonstrations		
9. Demonstration using Videos		
2. Demonstration using Physical Models/ Systems		
3. Demonstration on a Computer		
Numeracy		
1. Solving Numerical Problems		
Practical Work		
1. Course Laboratory		
2. Computer Laboratory		
3. Engineering Workshop/Course Workshop/Kitchen		
4. Clinical Laboratory		
5. Hospital		
6. Model Studio		
Others		

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1. Case Study Presentation		
2. Guest Lecture		
3. Industry/Field Visit		
4. Brain Storming Sessions		
5. Group Discussions		
6. Discussing Possible Innovations		
Written Examination (Mid-Term tests and SEE)		05
Total Duration in Hours		30

5. Method of Assessment

The following is the CE components:

Theory Course CE			**Theory Course SEE**
SC1 (Written Assignment)	SC2 (Assignment)	SC3 (Mid-term test)	40 marks
20 marks	20 Marks	20 Marks	

In CE there shall be three subcomponents of CE (SC1, SC2, and SC3), namely Mid Term; Written Assignment; Innovative assignments. Each subcomponent is evaluated individually accounting to 60% Weightage as indicated in Course Specifications. The innovative assignment subcomponents can be of any of the following types:

a) Online Test
b) Assignments/Problem Solving
c) Field Assignment
d) Open Book Test
e) Portfolio
f) Reports
g) Case Study
h) Group Task
i) Laboratory / Clinical Work Record
j) Computer Simulations
k) Creative Submission
l) Virtual Labs
m) Viva / Oral Exam
n) Lab Manual Report
o) Any other

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After the three subcomponents are evaluated, the CE component marks are consolidated to attain 60% Weightage. The Semester End Examination shall be a 2-hour theory paper of 50 marks with a weightage of 40% in case of theory courses. In summary, the ratio of Formative (Continuous Evaluation-CE) Vs Summative
(Semester End Examination-SEE) should be 60:40.

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The Course Leader assigned to the course, in consultation with the Head of the Department, shall provide the focus of COs in each component of assessment in the above template at the beginning of the semester.

Course reassessment policies are presented in the Academic Regulations document.

6. Achieving learning outcomes

The following skills are directly or indirectly imparted to the students in the following teaching and learning methods:

S.No	Curriculum and Capabilities	How imparted during the course
1.	Knowledge	Class room lectures
2.	Understanding	Class room lectures
3.	Critical Skills	Class room lectures
4.	Analytical Skills	Group discussion
5.	Problem Solving Skills	Case discussions
6.	Practical Skills	Case discussions
7.	Group Work	case study and group discussions
8.	Self-Learning	Seminars
9.	Written Communication Skills	Examination
10.	Verbal Communication Skills	Group discussions
11.	Presentation Skills	Seminars, Case discussions
12.	Behavioral Skills	Group discussion, Case discussions
13.	Information Management	Case discussions
15.	Leadership Skills	Group discussions

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III. Course Resources

1. Essential Reading

- Class notes
- Lippincott's Illustrated Reviews: Pharmacology, 5th edition, by Richard A. Harvey and PamelaChampe, Lippincott Williams & Wilkins Publisher

2. Recommended Reading

- Essentials of Medical Pharmacology: K.D. Tripathi, 6th edition, Jaypee Publishers

3. Magazines and Journals

- Indian Journal of Pharmacology. Published by Indian Pharmacological Society. (ISSN 0253-7613).

IV. Course Organization

Course Code		DTC202A
Course Title		Applied Pharmacology related to dialysis
Course Leader/s Name		
Course Leader Contact Details	**Phone:**	080 – 49065555
	E- mail:	
Course Specifications Approval		
Next Course Specifications Review		

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Course Specifications: Studentship [Directed clinical education] – II

Course Title	Studentship [Directed clinical education] – II
Course Code	DTC203A
Department	Allied Health Science
Faculty	Faculty of Life and Allied Health Sciences

I. Course Summary

1. Aim and Summary

The course aims to impart basic knowledge and additional skills in clinical procedures, and interaction with patients and professional personnel. Students apply knowledge from previous clinical learning experiences under the supervision of a nephrologist or senior Dialysis Therapy Technologist. Students are tested on intermediate clinical dialysis therapy technology skills.

At the end of this course, the student will be able to apply the knowledge acquired on renal diseases and the role of nutrition in managing the patient on dialysis. They will be assistingwith basic dialysis therapy techniques.

2. Course Size and Credits:

Number of credits	10
Total hours of class room interaction during the semester	0
Number of practical/tutorial hours	300
Number of semester weeks	16
Department responsible	Allied Health Sciences
Course evaluation	Total Marks: 100
Pass requirement	As per the Academic Regulations
Attendance requirement	As per the Academic Regulations

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II. Teaching, Learning and Assessment

1. Course Outcomes (CO)

No.	Intended Learning Outcomes
1.	Identify the presence of the kidney diseases

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2.	Assist in planning an appropriate diet according to the renal disease
3.	Assist in planning an appropriate diet according to the renal disease
4.	Assist in Initiating therapy in each of the conditions on time
5.	Assist in packing and sterilization of dialysis trays
6.	Perform basic life support

2. Course Contents:

Course Content
Introduction to Dialysis Unit • Explain the dialysis unit in terms of design, staff, job responsibilities and professionalism **Vital signs measurement** **Components of infection control** ○ dialysis unit protocols ○ personal protective equipment ○ waste management **Infection control in the dialysis unit** • List the causes for infection spreading in dialysis unit • Name the common infections seen in dialysis patients • Identify the risk factors for spreading infections, prevention and their complications • Explain waste management practices in the dialysis unit • Explain the infection control practices followed in the dialysis unit **Learn how to diagnose and evaluate patients with various disease conditions** • Acute renal failure, nenephrotic/nephritic syndrome, urinary tract infection, Asymptomatic urinary abnormalities, Chronic Kidney Disease (especially stage v) renal stone diseases, obstructive nephropathies, congenital & inherited renal diseases, pregnancy associated renal diseases, renal vasculardisorders and hypertension associated renal diseases, renal vascular disorders and hypertension associated renal diseases; • Learn to order appropriate test towards confirmation of diagnosis; • Learn to initiate therapy in each of these conditions • Practice to do the patient assessment pre & post-dialysis in the pre-setup and dialysis record documentation

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3. Course Map (CO-PO-PSO Map)

	Programme Outcomes (POs)												Programme Specific Outcomes (PSOs)			
	PO -1	PO -2	PO -3	PO -4	PO -5	PO -6	PO -7	PO -8	PO -9	PO -10	PO -11	PO -12	PSO -1	PSO -2	PSO -3	PSO -4
CO-1	3							2					1			2
CO-2	3							2					1			2
CO-3	3							2					1			2
CO-4	3							2					1			2
CO-5	3							2					1			2
CO-6	3							2					1			2
3: Very Strong Contribution, 2: Strong Contribution, 1: Moderate Contribution																

4. Course Teaching and Learning Methods

Teaching and Learning Methods	Duration in hours	Total Duration in Hours
Face to Face Lectures		0
Demonstrations		
10. Demonstration using Videos		
2. Demonstration using Physical Models/ Systems		
3. Demonstration on a Computer		
Numeracy		
1. Solving Numerical Problems		
Practical Work		
1. Course Laboratory	20	
2. Computer Laboratory		
3. Engineering Workshop/Course Workshop/Kitchen		100
4. Clinical Laboratory		
5. Hospital	80	
6. Model Studio		
Others		
1. Case Study Presentation		
2. Guest Lecture		
3. Industry/Field Visit		20
4. Brain Storming Sessions		
5. Group Discussions		
6. Discussing Possible Innovations		
Written Examination (Mid-Term tests and SEE)		
Total Duration in Hours		120

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5. Method of Assessment

The following is the CE components:

Component CE	
SC1 (Log book)	SC2 (Viva Voce)
50 Marks	50 Marks

In CE there shall be two subcomponents of CE (SC1, SC2,), namely log book and viva-voce assessment. Eachsubcomponent is evaluated individually accounting to 100% Weightage as indicated in Course Specifications.

6. Achieving learning outcomes

The following skills are directly or indirectly imparted to the students in the following teaching and learning methods:

S.No	Curriculum and Capabilities	How imparted during the course
1.	Knowledge	Class room lectures
2.	Understanding	Class room lectures
3.	Critical Skills	Class room lectures
4.	Analytical Skills	Group discussion
5.	Problem Solving Skills	Case discussions
6.	Practical Skills	Case discussions
7.	Group Work	case study and group discussions
8.	Self-Learning	Seminars
9.	Written Communication Skills	Examination
10.	Verbal Communication Skills	Group discussions
11.	Presentation Skills	Seminars, Case discussions
12.	Behavioral Skills	Group discussion, Case discussions
13.	Information Management	Case discussions
15.	Leadership Skills	Group discussions

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III. Course Resources

1. Essential Reading
   - Class notes
2. Recommended Reading
   - Essentials of Medical Pharmacology: K.D. Tripathi, 6th edition, Jaypee Publishers
3. Magazines and Journals
   - Journal of Renal disorders and management
4. Websites

IV. Course Organization

Course Code		DTC203A
Course		Directed Clinical Education]- II
Course Leader/s Name		
Course Leader Contact Details	**Phone:**	080 – 49065555
	E- mail:	
Course Specifications Approval		
Next Course Specifications Review		

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Course Specifications: Entrepreneurship Development

Course Title	Entrepreneurship Development
Course Code	AHM204A
Course Type	Core Theory Course
Department	Allied Health Science
Faculty	Faculty of Life and Allied Health Sciences

I. Course Summary

1. Aim and Summary

The open elective common course on Entrepreneurship Development has been introduced across all the undergraduate programs with an aim to impart comprehensive knowledge of an entrepreneurial ecosystem. Further, the course enables to develop entrepreneurial skills by building entrepreneurial intentions among students. The students also gain knowledge on competencies to provide with necessary inputs for creation of new ventures and scaling up existing startups. The students are also introduced to design thinking process to nurture entrepreneurial way of thinking.

2. Course Size and Credits:

Number of Credits	03
Credit Structure (Lecture: Tutorial: Practical)	1:1:1
Total Hours of Interaction	
Number of Weeks in a Semester	15
Department Responsible	Respective Department of the Faculty
Total Course Marks	100
Pass requirement	As per the Academic Regulations
Attendance requirement	As per the Academic Regulations

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II. Teaching, Learning and Assessment

1. Course Outcomes (CO)

Upon completion of this course students will be able to:-

No.	Intended Learning Outcomes
1.	Discuss the concepts and process of entrepreneurship
2.	Construct and apply the idea generation techniques
3.	Examine the opportunities for launching of new venture and various entry strategies
4.	Acquire the skills for creation and management of entrepreneurial venture
5.	Present a viable business plan, for business success

2. Course Contents:

Unit 1: Introduction to Entrepreneurship

Introduction to entrepreneurship, Evolution of the concept, Entrepreneurial process, Types ofEntrepreneurship - Social entrepreneurship, rural entrepreneurship. Ccharacteristics of an entrepreneur, incorporation of a company, managing a family business, corporate intrapreneurship

Unit 2:

Creativity and the Business idea): Key elements in an entrepreneur's background. Types ofInnovations. Identify various sources of ideas for new ventures- methods available for generating new venture ideas- creativity, design thinking and the techniques for creative problem solving. Aspects of the product planning and development process

Unit 3

New Venture:

Creating opportunities, resources, role of new ventures and small businesses in the economy, types of entry strategies, launch a new venture and the generic strategies

Unit 4

Strategies to Sustain and Grow

Strategies for expansion, joint ventures, acquisitions, merges, franchising, public issues, rights issues, bonus issues, growth strategy, exit strategy.

Unit 5 Business Plan

Business plan, scope and value of the business plan, step-by-step explanation of the business plan,marketing plan, Organizational plan, financial plan (source of capital), entrepreneurship models

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3. Course Map (CO-PO-PSO Map)

	Programme Outcomes (POs)												Programme Specific Outcomes (PSOs)			
	PO -1	PO -2	PO -3	PO -4	PO -5	PO -6	PO -7	PO -8	PO -9	PO -10	PO -11	PO -12	PSO -1	PSO -2	PSO -3	PSO -4
CO-1	2	2	2									2			3	CO-1
CO-2	3	2	2	2	3								3	2		CO-2
CO-3	3	3	2	2								2		2		CO-3
CO-4	3	2	2	2	2	3			3	3			2		3	CO-4
CO-5	2	3		2							3		2	3		CO-5
3: Very Strong Contribution, 2: Strong Contribution, 1: Moderate Contribution																

4. Course Teaching and Learning Methods

Teaching and Learning Methods	Duration in hours	Total Durationin Hours
Face to Face Lectures		20
Demonstrations		02
1. Demonstration using Videos	02	
2. Demonstration using Physical Models / Posters	00	
3. Demonstration on a Computer	00	

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Numeracy		00
1. Solving Numerical Problems	00	
Practical Work		03
1. Course Laboratory	00	
2. Computer Laboratory	00	
3. Engineering Workshop / Course/Workshop / Kitchen	03	
4. Clinical Laboratory	00	
5. Hospital	00	
6. Model Studio	00	
Others		15
1. Case Study Presentation	05	
2. Guest Lecture	01	
3. Industry / Field Visit	02	
4. Brain Storming Sessions	02	
5. Group Discussions	04	
6. Discussing Possible Innovations	01	
Term Tests, Laboratory Examination/Written Examination, Presentations		05
Total Duration in Hours		**45**

5. Method of Assessment

The details of the components and subcomponents of course assessment are presented in the Programme Specifications document pertaining to the MPH Programme. The procedure to determine the final course marks is also presented in the Programme Specifications document.

The evaluation questions are set to measure the attainment of the COs. In either component (CE or SEE) or subcomponent of CE (SC1, SC2 or SC3), COs are assessed as illustrated in the following Table.

Focus of COs on each Component or Subcomponent of Evaluation				
	Component 1: CE (60% Weightage)			**Component 2: SEE (40% Weightage)**
Subcomponents	**SC1**	**SC2**	**SC3**	**SC4**
Subcomponent Type	**Mid-Term Test**	**Assignment**	**Flexible component**	**100 marks**
Maximum Marks	**50**	**25**	**25**	
CO-1	X		X	X
CO-2	X		X	X
CO-3		X	X	X

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CO-4		X	X	X
The details of SC1, SC2, SC3 or SC4 are presented in the Programme Specifications Document.				

The Course Leader assigned to the course, in consultation with the Head of the Department, shall provide the focus of COs in each component of assessment in the above template at the beginning of the semester.

Course reassessment policies are presented in the Academic Regulations document.

6. Achieving learning outcomes

The following skills are directly or indirectly imparted to the students in the following teaching and learning methods:

S. No	Curriculum and Capabilities Skills	How imparted during the course
1.	Knowledge	Class room lectures
2.	Understanding	Class room lectures
3.	Critical Skills	Assignment
4.	Analytical Skills	Class room, assignment, examination
5.	Problem Solving Skills	Assignment, Field visit and presentation
6.	Practical Skills	Assignment
7.	Group Work	Case study Presentation
8.	Self-Learning	Assignment
9.	Written Communication Skills	Assignment, examination
10.	Verbal Communication Skills	Case study and group discussions
11.	Presentation Skills	Case study and group discussions
12.	Behavioral Skills	Group discussions
13.	Information Management	Assignment
14.	Personal Management	Assignment and Group Discussion

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III. Course Resources

1. Essential Reading
   - Course notes
   - Rajeev Roy, (2011), *Entrepreneurship*, Oxford University Press, 2nd Edition
   - Robert D. Hisrich, Michael P. Peters, *Entrepreneurship (2017)* Dean A. Shepherd. Tenth edition.
     New York, NY : McGraw-Hill Education

2. Recommended Reading
   - Poornima. M. Charantimath, *Entrepreneurship Development* (2006) Small Business Enterprises,

3. Magazines and Journals
   - Business World: ABP Group - Fortnightly business magazine
   - Journal of small business management , Blackwell publishing- yearly
   - Business Strategy: PwC Strategy& Inc. - Quarterly issue

4. Websites
   - www. startup India.org
   - www. allsharktankproducts .com

IV. Course Organization

Course		Entrepreneurship Development and Startups
Course		AHM204A
Course Leader/s Name		
Course Leader Contact Details	**Phone:**	080 – 49065555
	E-mail:	
Course Specifications Approval		
Next Course Specifications Review		

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Dialysis Therapy Technology (DTT) 2022-2026

SEMESTER 4

Course Specifications: Techniques in Hemodialysis

Course Title	Techniques in Hemodialysis
Course Code	DTC204A
Department	Allied Health Science
Faculty	Faculty of Life and Allied Health Sciences

I. Course Summary

1. Aim and Summary

The course aims to impart knowledge on hemodialysis and its role in health and diseases, the course isdesigned to provide an understanding of hemodialysis in chronic kidney disease. The students are oriented to hemodialysis apparatus physiological differences and nutritional support with special emphasis on parental nutrition.
Students learn about sample collection, and different HD apparatus used and they will perform routineHD procedures and blood investigations and interpret and diagnose abnormalities

2. Course Size and Credits:

Number of credits	4
Total hours of class room interaction during the semester	30
Number of practical/tutorial hours	40/20
Number of semester weeks	16
Department responsible	Allied Health Sciences
Course evaluation	Total Marks: 100
Pass requirement	As per the Academic Regulations
Attendance requirement	As per the Academic Regulations

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II. Teaching, Learning and Assessment

1. Course Outcomes (CO)

Upon completion of this course students will be able to:

No.	Intended Learning Outcomes
1.	Classify the various types and techniques of anticoagulation in hemodialysis
2.	Discuss hemodialysis prescription and hemodialysis adequacy
3.	Explain the types of vascular access, their advantages, disadvantages, complications, and their management and pre and post-vascular accesscreation assessment and monitoring
4.	Describe the dialysis water treatment plant components, their functions, and monitoring of water treatment plant
5.	Explain the steps of dialyzer reprocessing and complications related to dialyzer reprocessing
6.	Explain the hemodialysis patient-related and machine-related complications and their management

2. Course Contents:

Course Content
1. Hemodialysis types • Define hemodialysis and list the clinical applications of hemodialysis • List the types of hemodialysis • Outline the types of intermittent and continuous hemodialysis therapies • List the indications and contraindications for hemodialysis • List the advantages and disadvantages of hemodialysis. Hemodialysis Principles • Discuss the application of diffusion in HD and list the factors affecting diffusion • Discuss ultrafiltration and convection in hemodialysis and factors affecting them • List the factors affecting solute clearance in HD • Define Kuf & KoA 3. Introduction to hemodialysis apparatus • Dialyzer: • Define the extracorporeal circuit and list the functions • Explain the structure of dialyzer with diagram • Classify the dialyzers based on design, material and dialyzer performance (flux & efficiency) • Describe the characters of all types of dialyzers (Biocompatibility, membrane pores, surfacearea) • List characters of ideal dialyzer • Hemodialysis Machine • List and explain the types of hemodialysis machines based on ultrafiltration removaltechnique • List the functions of the HD machine

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- Explain the uses, advantages, and disadvantages of ultrafiltration and sodium profiling
- Explain the maintenance of HD machines (Daily self-test monitoring, disinfection, machine servicing, calibration)
- Discuss the advanced options available in HD machines

• Hemodialysis dialysate:

- Define HD concentrates and dialysate
- List the functions of HD dialysate
- List the features of HD dialysate and List the importance of dialysate temperature, pH, flowgeometry & conductivity)
- List the types of HD dialysate and discuss their composition
- Explain the HD dialysate preparation
- Discuss the advantages and disadvantages of different types of dialysate
- Discuss the complications of dialysate (patient elated & machine-related)

4. Hemodialysis (HD)- Anticoagulation

- Define anticoagulants & anticoagulation
- List the anticoagulants used in hemodialysis
- List and classify anticoagulation techniques used for hemodialysis
- Explain the mechanism of action, half-life, target clotting time, prescription and complication of low molecular weight heparin & unfractionated heparin
- Discuss the indications, administration procedure, complication, management, advantages & disadvantages of unfractionated heparin, regional citrate anticoagulation,regional heparinization & saline dialysis
- Explain the tests used to assess coagulation during dialysis
- List the importance of monitoring of anticoagulation during dialysis
- Explain low molecular weight heparin
- Compare Low molecular weight heparin & unfractionated heparin
- List the characteristics of ideal anticoagulants

5. HD prescription

- List the components of hemodialysis prescription
- Discuss each component of HD prescription & explain their effect on HD adequacy to choose dialyzer, dialysis solution, set anticoagulation dose, blood flow, dialysate flow, UF goal-based on individual patient characteristics
- Explain hemodialysis prescription for first HD,regular HD hemodialysis, pediatric patients, and pregnant patients

6. HD adequacy

- Define adequacy
- How to measure hemodialysis dose
- List the values of the recommended dose and target dose of Kt/v & URR
- Explain URR, Kt/V, Sp Kt/V, Equilibrate Kt/V and their role in HD adequacy
- Explain the sampling method to measure hemodialysis adequacy
- Explain the factors that determine HD adequacy

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7: Vascular Access

- Define vascular access
- List the importance of vascular access
- List the types of vascular access
- Classify temporary vascular access based on design & duration
- List the indications and contraindications for insertion of this access, their advantages &disadvantages
- Discuss the immediate and late complications, their prevention and management
- Compare the temporary vascular access types
- Discuss the design of semipermanent vascular access
- List the indications and contraindications for this access, their advantages & disadvantages
- Discuss the immediate and late complications, their prevention and management
- List the types of permanent vascular access
- List the indications and contraindications for this access
- List the sites of permanent vascular access creation
- List the blood vessels and materials used to create permanent vascular access
- Explain the pre-assessment steps to create permanent vascular access (Doppler, Venogram,arteriogram, Allen's test)
- Define anastomosis
- List the types of anastomosis used to create permanent vascular access and their advantagesand disadvantages
- Select and discuss the assessment required after the vascular access creation and continuousmonitoring
- Explain the "Rule of 6" and arteriovenous fistula maturation
- List the vascular access cannulation technique
- List the advantages & disadvantages of this access
- Discuss the immediate and late complications, their prevention and management
- Compare the types of permanent vascular access
- List the features of ideal vascular access
- Compare the types of vascular access

8. Water treatment plant

- List the purpose of water treatment plant (WTP) in dialysis unit
- List the common impurities present in source water
- Select the ideal location for WTP installation
- Draw the schematic diagram of WTP
- List the components of WTP and their functions
- Explain the principals involved in water purification
- Discuss the pretreatment plant (Sand filter, Activated carbon filter, softener, deionizer, andother types filters)
- Discuss R.O.
- Describe the distribution system (Direct distribution system & indirect distribution system
- List the purpose of UV rays, endotoxin filters and micron filters
- Explain the monitoring & maintenance of WTP (Daily and continuous: List – filter wash, changing the filters, regeneration, analysis of product water quality disinfection distributionsystem & R.O)
- List the disadvantages of WTP components
- List the complications and their prevention and management related to WTP
- List the use of product water in dialysis treatment

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9. Water treatment plant

- List the purpose of water treatment plant (WTP) in dialysis unit
- List the common impurities present in source water
- Select the ideal location for WTP installation
- Draw the schematic diagram of WTP
- List the components of WTP and their functions
- Explain the principals involved in water purification
- Discuss the pretreatment plant (Sand filter, Activated carbon filter, softener, deionizer, andother types filters)
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- Describe the distribution system (Direct distribution system & indirect distribution system
- List the purpose of UV rays, endotoxin filters and micron filters
- Explain the monitoring & maintenance of WTP (Daily and continuous: List – filter wash, changing the filters, regeneration, analysis of product water quality disinfection distributionsystem & R.O)
- List the disadvantages of WTP components
- List the complications and their prevention and management related to WTP
- List the use of product water in dialysis treatment

10. Dialyzer reprocessing

- Define reuse, reprocessing of the dialyzer, sterilization, and disinfection
- List the purpose of dialyzer reprocessing
- List the types of dialyzer reprocessing
- List the pre-requirements for dialyzer reprocessing
- List and explain the steps of dialyzer reprocessing and their importance
- List the chemicals used for dialyzer reprocessing and their composition
- Outline the reprocessing area design
- List the advantages and disadvantages of dialyzer reprocessing
- List the complications and their prevention and management of dialyzer reprocessing

11. Hemodialysis complications

- Identify and explain the patient-related complications and their prevention & management
- Identify and explain the technical complications and their prevention and management

Practical

Unit 1: Hemodialysis procedure with catheters

- Handling the HD Catheters
- Identify and follow the HD prescription
- Identify HD catheters
- Identify the catheter location and design
- Explain the procedure to the patient
- Inspect the catheter for dressing, sutures, and hygiene
- Examine the catheter exit site for infection
- Perform the cleaning of the catheter, catheter site and catheter site dressing and minimizethe infection chances
- Inspect the HD catheter for blood flow and blood clots
- Explain the importance of catheter hygiene to the patient and caretakers
- HD initiation and termination with the catheter

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- Follow the prescription and identify the patient condition to set the parameters
- Inspect the extracorporeal circuit for any malfunctioning
- Follow the steps of HD catheter initiation
- Select the proper anticoagulant dosage and administer according to the prescription
- Analyze the procedure and patient for any complications
- List if any blood components/drugs to be administered to the patient by referringprescription
- Follow the steps of HD termination according to the prescription
- Choose the proper dressing method as per the protocol to prevent infection
- Explain the post HD care of catheters to the patient and

care-takers2: Water Treatment Plant

- Monitoring
- Label the components of WTP
- Identify any changes in the proper water level, power supply, pressure, leakage and productwater output
- Demonstrate the steps of water hardness test
- Select the sample collection sites for periodical monitoring of the WTP (biochemical tests,microbiological tests, and endotoxin levels
- Relate the test reports with the water quality by referring unit protocol
- Make use of service reports of WTP to understand the periodical monitoring of filtermedium and quality check
- Demonstrate the steps of daily wash to the filters
- Demonstrate the steps of brine solution preparation
- Demonstrate the steps of softener regeneration
- Demonstrate the method of water sample collection for various tests
- Demonstrate the steps of distribution system disinfection
- Demonstrate the method of changing the micron filters
- Explain documentation of parameters and identify the changes in the

parameters3: Dialyzer Reprocessing

- Dialyzer reprocessing procedure
- Identify the chemicals and their concentration used for dialyzer reprocessing
- Demonstrate the method of chemical dilution
- Identify the required materials for the reprocessing area
- Demonstrate the steps of manual and automated dialyzer reprocessing
- Explain Documentation of dialyzer reprocessing process

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3. Course Map (CO-PO-PSO Map)

	Programme Outcomes (POs)												Programme Specific Outcomes (PSOs)			
	PO -1	PO -2	PO -3	PO -4	PO -5	PO -6	PO -7	PO -8	PO -9	PO -10	PO -11	PO -12	PSO -1	PSO -2	PSO -3	PSO -4
CO-1	3		1					1	2	2		1	3		1	
CO-2	2							1	2	1		1	2			
CO-3	3	2			1			1	3	2		1	3	2		
CO-4	3	2	1		1			1	3	2		1	3	2	1	
CO-5	3	2	1					1	2	1		1	3	2	1	
CO-6	2	2	1					1	2	1		1	2	2	1	
3: Very Strong Contribution, 2: Strong Contribution, 1: Moderate Contribution																

4. Course Teaching and Learning Methods

Teaching and Learning Methods	Duration in hours	Total Duration in Hours
Face to Face Lectures		30
Demonstrations		
8. Demonstration using Videos		
2. Demonstration using Physical Models/ Systems		
3. Demonstration on a Computer		
Numeracy		
1. Solving Numerical Problems		
Practical Work		
1. Course Laboratory	20	
2. Computer Laboratory		
3. Engineering Workshop/Course Workshop/Kitchen		40
4. Clinical Laboratory	20	
5. Hospital		
6. Model Studio		
Others		
1. Case Study Presentation	10	
2. Guest Lecture		
3. Industry/Field Visit		10
4. Brain Storming Sessions		
5. Group Discussions		
6. Discussing Possible Innovations		
Written Examination (Mid-Term tests and SEE)		10
Total Duration in Hours		90

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5. Method of Assessment

The following is the CE components:

Theory Component CE			Laboratory Component CE	SEE
SC1 (Written Assignment)	SC2 (Assignment)	SC3 (Mid-term test)	SC4 (Formative laboratory performance assessment)	SEE
20 Marks	20 Marks	20 Marks	30 Marks	60 (40 written exam; 20 Viva-voce)

In CE there shall be four subcomponents of CE (SC1, SC2, SC3, and SC4), namely Mid Term; Written Assignment;

Innovative assignments; and Laboratory performance assessment. Each subcomponent is evaluated individually

accounting to 60% Weightage as indicated in Course Specifications. The innovative assignment subcomponents

can beof any of the following types:

a) Online Test
b) Assignments/Problem Solving
c) Field Assignment
d) Open Book Test
e) Portfolio
f) Reports
g) Case Study
h) Group Task
i) Laboratory / Clinical Work Record
j) Computer Simulations
k) Creative Submission
l) Virtual Labs
m) Viva / Oral Exam
n) Lab Manual Report
o) Any other

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After the four subcomponents are evaluated, the CE component marks are consolidated to attain 60% Weightage. Laboratory/Practical shall be shifted as part of CE. The lab component as part of CE will have external

examiner evaluation and marks listed separately for industry requirements. For a theory + laboratory course, the

Semester End Examination shall be a 2-hour theory paper of 50 marks with a weightage of 40% and there will be

a 20 marks Viva- Voce. In summary, the ratio of Formative (Continuous Evaluation-CE) Vs Summative (Semester End

Examination-SEE)should be 60:40

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6. Achieving learning outcomes

The following skills are directly or indirectly imparted to the students in the following teaching and learning methods:

S.No	Curriculum and Capabilities	How imparted during the course
1.	Knowledge	Class room lectures
2.	Understanding	Class room lectures
3.	Critical Skills	Class room lectures
4.	Analytical Skills	Group discussion
5.	Problem Solving Skills	Case discussions
6.	Practical Skills	Case discussions
7.	Group Work	case study and group discussions
8.	Self-Learning	Seminars
9.	Written Communication Skills	Examination
10.	Verbal Communication Skills	Group discussions
11.	Presentation Skills	Seminars, Case discussions
12.	Behavioral Skills	Group discussion, Case discussions
13.	Information Management	Case discussions
15.	Leadership Skills	Group discussions

III. Course Resources

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1. Essential Reading

- Class notes
- John T. Daugirdas, Peter G. Blake, Todd S. Ing . Handbook of Dialysis, 5th edition (2014),Lippincott Williams and Wilkins.
- Allen R. Nissenson ,Richard N. Fine Dialysis Therapy 3 edition (2001) Hanley & Belfus
- R. Gokal, Ramesh Khanna, Raymond T. Krediet , K.D. Nolph. Textbook of Peritoneal –Dialysis 2nd ed. edition (2000) Springer.
- Text book of Nephrology –Oxford and Brenner Rector (Reference only)

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2. Recommended Reading

- R. Gokal, Ramesh Khanna, Raymond T. Krediet , K.D. Nolph. Textbook of Peritoneal –Dialysis 2nd ed. edition (2000) Springer.
- Text book of Nephrology –Oxford and Brenner Rector (Reference only)

3. Magazines and Journals
    - Journal of Renal disorders and management
    - Hemodialysis techniques
4. Websites

IV. Course Organization

Course Code		DTC204A
Course Title		Techniques in Hemodialysis
Course Leader/s Name		
Course Leader Contact Details	**Phone:**	080 – 49065555
	E- mail:	
Course Specifications Approval		
Next Course Specifications Review		

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Course Specifications: Investigations in Renal Diseases

Course Title	Investigations In Renal Diseases
Course Code	DTC205A
Department	Allied Health Science
Faculty	Faculty of Life and Allied Health Sciences

I. Course Summary

1. Aim and Summary

The aim of the course is to introduce students of dialysis technology to the basis investigations in renal diseases. This should help them to understand the investigations done in various renal disease conditions. This course provides the necessary knowledge on laboratory technology-related aspects applied to dialysis technology and dialysis field. It provides the basic knowledge of radiological investigations -related to dialysis technology

2. Course Size and Credits:

Number of credits	02
Total hours of class room interaction during the semester	30
Number of practical/tutorial hours	
Number of semester weeks	16
Department responsible	Allied Health Sciences
Course evaluation	Total Marks: 50
Pass requirement	As per the Academic Regulations
Attendance requirement	As per the Academic Regulations

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II. Teaching, Learning and Assessment

1. Course Outcomes (CO)

Upon completion of this course students will be able to:

No.	Intended Learning Outcomes
1.	Explain the hematological, biochemical and microbiological tests used in renal failure patients
2.	Explain the basic principles of blood crossmatching and immunologic test related to renal disease
3.	Explain renal biopsy
4.	Explain the basics radiological investigations related to dialysis technology
5.	Explain the importance of nuclear medicine and radiological interpretations sKUB X-ray, MRI, USG, Renal Doppler for assessing renal functions and vasculafor dialysis

2. Course Contents:

Course Content
1. Hematological tests • Define blood and list the blood components • List the hematological abnormalities in CKD • Explain the anemia causes, classification • Explain the features of polycythemia • Define hemoglobin and list its functions • Explain the features and mechanism of erythrocyte production • List the types of an abnormal concentration of the hemoglobin • Explain the types of an abnormal concentration of the hemoglobin • Explain methods of hemoglobin estimation • What is PCV and list the clinical significance • Explain inflammatory hematological markers • Explain the consequences of abnormal PT and APTT
2. Biochemistry tests (GFR, RFT,LFT, Urinalysis,etc.) • List the importance of renal function test • List the preliminary investigations to assess renal function • Explain the formation of urine and renal threshold substances • List and explain renal function test with the clinical significance • List and explain the test for assessment of glomerular function

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- List the clearance test and its importance
- List and explain the test for assessment of tubular function
- Define urine concentration and dilution test
- Explain physical, chemical and microscopic examination of urine
- Explain proteinuria and hematuria
- Explain the urine sample collection and urinalysis
- List the classification of liver function test
- List the LFT tests based on excretory function
- List the LFT tests based on detoxification
- List the LFT tests based on synthetic function
- List and explain Liver Function tests in the diagnosis of liver disorder

6.Basics of immunology &tests

- List the role of the immune system
- Explain the organ, cells, and molecules of the immune system
- Explain the types and mechanisms of immunity
- Explain types of antibodies
- List the complication in the failure of an immune response
- List the basic immunological tests relevant to renal diseases
- Explain types of antigen-antibody reactions
- List the applications of antigen-antibody reactions
- List the tests done during renal transplantation (HLA,
- PRA, tissue cross-match)

7. Microbiology(Viral infections HBsAg, HCV,HIV, CMV, BKV)

- List the viral infection seen in renal failure patients
- Explain laboratory findings of HBsAg, HCV, HIV,
- CMV, BKV in renal failure5.Biopsy tests
- Define biopsy
- Explain the handling and processing of renal biopsy

8. X-rayUltrasound,Doppler, CT scan,MRI

Diagnostic X-ray

- Define X-rays
- Explain the Bremsstrahlung and characteristic radiation
- List the properties of X-ray
- List the factors influencing the quality and intensity of X-ray
- Explain the related radiological anatomy of KUB
- Classify the indications for KUB radiography
- Explain the patient preparation, positioning technique required for AP projection of KUB
- Identify the structures seen on AP projection of KUB
- USG
- Explain the basic rules of scanning
- What is the orientation of the image
- Explain acoustic enhancement and acoustic shadowing
- List the types of probes used in ultrasound

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- Explain abdomen screening protocol
- Explain the indications, scanning technique advantages and limitations of KUB scan
- Illustrate the role of USG in CKD, Dialysis & Renal transplant recipient

Renal Doppler

- What is Doppler physics
- Explain doppler shift, frequency and Doppler equipment
- List the types of Doppler
- Explain the indications, patient preparation technique for Doppler spectral analysis of renal vascular hypertension and renal transplantation for graft assessment
- Explain the assessment of AV fistula for dialysis using USG

CT scan

- Define computed tomography
- Explain the principles and generation of CT
- Explain the indications, contraindications, Patient preparation, technique of KUB
- List the advantages and disadvantages of CT KUB
- Explain the indications, contraindications, patient preparation, techniques of CT Urogram
- List the advantages and disadvantages of CT

Urogram

- Explain the indications, contraindications, patient preparation, techniques of CT renal
- angiogram for renal transplant donor
- MRI
- Explain the basic principles of MRI
- List the indications and contraindications for MR

Urography

- Explain the patient preparation and positioning, the technique for MR Urography
- Explain the sequences and importance of each sequence used for MRI Urography
- List the advantages and disadvantages of MR

Fluoroscopic procedures

- Intravenous Urogram (I.V.U)
- What is Intravenous Urogram
- List the indication and contraindication for
- List the risk factors for Intravenous Urogram
- Explain the patient preparation and usage of contrast media in Intravenous Urogram
- Explain scout film
- List the usage of the standard films for Intravenous
- Micturating cystourethrography
- What is micturating cystourethrography
- List the indication & contraindications of micturating cystourethrography
- List the material required for micturating cystourethrography
-

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3. Course Map (CO-PO-PSO Map)

	Programme Outcomes (POs)												Programme Specific Outcomes (PSOs)			
	PO -1	PO -2	PO -3	PO -4	PO -5	PO -6	PO -7	PO -8	PO -9	PO -10	PO -11	PO -12	PSO -1	PSO -2	PSO -3	PSO -4
CO-1	2			2	2				2				2			2
CO-2	2			1	2				2				2			1
CO-3	2				2				2				2			
CO-4	3				2			1	3			1	3			
CO-5	2				2			1	2			1	2			
CO-6																
3: Very Strong Contribution, 2: Strong Contribution, 1: Moderate Contribution																

4. Course Teaching and Learning Methods

Teaching and Learning Methods	Duration in hours	Total Duration in Hours
Face to Face Lectures		20
Demonstrations		
9. Demonstration using Videos		
2. Demonstration using Physical Models/ Systems		
3. Demonstration on a Computer		
Numeracy		
1. Solving Numerical Problems		
Practical Work		
1. Course Laboratory		
2. Computer Laboratory		
3. Engineering Workshop/Course Workshop/Kitchen		0
4. Clinical Laboratory		
5. Hospital		
6. Model Studio		
Others		
1. Case Study Presentation	05	
2. Guest Lecture		
3. Industry/Field Visit		05
4. Brain Storming Sessions		
5. Group Discussions		
6. Discussing Possible Innovations		
Written Examination (Mid-Term tests and SEE)		05
Total Duration in Hours		30

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5. Method of Assessment

The following is the CE components:

Theory Component CE			Laboratory Component CE	SEE
SC1 (Written Assignment)	SC2 (Assignment)	SC3 (Mid-term test)	SC4 (Formative laboratory performance assessment)	SEE
20 Marks	20 Marks	20 Marks	30 Marks	60 (40 written exam;

In CE there shall be four subcomponents of CE (SC1, SC2, SC3, and SC4), namely Mid Term; Written Assignment; Innovative assignments; and Laboratory performance assessment. Each subcomponent is evaluated individually accounting to 60%Weightage as indicated in Course Specifications. The innovative assignment subcomponents can be of any of the following types:

a) Online Test
b) Assignments/Problem Solving
c) Field Assignment
d) Open Book Test
e) Portfolio
f) Reports
g) Case Study
h) Group Task
i) Laboratory / Clinical Work Record
j) Computer Simulations
k) Creative Submission
l) Virtual Labs
m) Viva / Oral Exam
n) Lab Manual Report
o) Any other

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After the four subcomponents are evaluated, the CE component marks are consolidated to attain 60% Weightage. Laboratory/Practical shall be shifted as part of CE. The lab component as part of CE will have external examiner evaluation and marks listed separately for industry requirements. For a theory + laboratory course, the Semester End Examination shall be a 2-hour theory paper of 50 marks with a weightage of 40% and there will be a 20 marks Viva- Voce. In summary, the ratio of Formative (Continuous Evaluation-CE) Vs Summative (Semester End Examination-SEE)should be 60:40.

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6. Achieving learning outcomes

The following skills are directly or indirectly imparted to the students in the following teaching and learning methods:

S.No	Curriculum and Capabilities	How imparted during the course
1.	Knowledge	Class room lectures
2.	Understanding	Class room lectures
3.	Critical Skills	Case study and group discussions
4.	Analytical Skills	Group discussion
5.	Problem Solving Skills	Case discussions
6.	Practical Skills	Case discussions
7.	Group Work	Case study and group discussions
8.	Self-Learning	Assignments/Reports
9.	Written Communication Skills	Examination
10.	Verbal Communication Skills	Group discussions
11.	Presentation Skills	Case discussions
12.	Behavioral Skills	Group discussion, Case discussions
13.	Information Management	Case discussions
14.	Leadership Skills	Group discussions

III. Course Resources

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1. Essential Reading

- Class notes
- John T. Daugirdas, Peter G. Blake, Todd S. Ing . Handbook of Dialysis, 5th edition (2014), Lippincott Williams and Wilkins.
- Allen R. Nissenson ,Richard N. Fine Dialysis Therapy 3 edition (2001) Hanley & Belfus
- R. Gokal, Ramesh Khanna, Raymond T. Krediet , K.D. Nolph. Textbook of Peritoneal –Dialysis 2nd ed. edition (2000) Springer.
- Text book of Nephrology –Oxford and Brenner Rector (Reference only)

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2. Recommended Reading

- R. Gokal, Ramesh Khanna, Raymond T. Krediet , K.D. Nolph. Textbook of Peritoneal –Dialysis 2nd ed. edition (2000) Springer.
- Text book of Nephrology –Oxford and Brenner Rector (Reference only)

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3. Magazines and Journals
   - Journal of Renal disorders and management
   - Hemodialysis techniques
4. Websites

IV. Course Organization

Course Code		DTC205A
Course Title		Investigations In Renal Diseases
Course Leader/s Name		
Course Leader Contact Details	**Phone:**	080 – 49065555
	E- mail:	
Course Specifications Approval		
Next Course Specifications Review		

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Course Specifications: Constitution of India

Course Title	Constitution of India
Course Code	AHN203A
Department	Allied Health Sciences
Faculty	Faculty of Life and Allied Health Sciences

1. Course Summary

1. Aim and Summary

This course aims at enabling students understand the key principles of Indian Constitution, Medical law and Ethics. The course facilitates the understanding of the framework of Indian constitution. Health professionals are bound by, not just moral obligations, but also by laws and official regulations that form the legal framework to regulate medical practice. Hence, it is now a universal consensus that legal and ethical considerations are inherent and inseparable parts of good medical practice across the whole spectrum.

2. Course Size and Credits:

Number of credits	2
Total hours of class room interaction during the semester	30
Number of Tutorial hours	00
Number of semester weeks	16
Department responsible	Allied Health Sciences.
Course marks	Total Marks: 50 The distribution of marks for theory component for continuous and Semester end examination is as per the Programme specification
Pass requirement	As per the Academic Regulations
Attendance requirement	As per the Academic Regulations

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Teaching, Learning and Assessment

1. Course Outcomes

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Upon completion of this course students will be able to:

No.	Course outcome
1.	**CO1:** Explain the key principles of the Indian Constitution
2.	**CO2:** Explain the medico-legal aspects of patient care including informed consent
3.	**CO3:** Discuss euthanasia, organ donation, the organ transplant act and care of terminally ill patient
4.	**CO4:** Discuss the scope and application of Medical Law
5.	**CO5:** Suggest strategies for protection of human rights and resolving legal issues in compliance with applicable laws

4. Course Contents:

- **Indian Constitution**: Democratic institutions. Bicameral system of Legislature. Fundamental rights and duties. Principles of states policies Special Rights for dalits, backwards, women and children and the religious and linguistic minorities Doctrine of Separation of Powers legislative in India the Election Commission Constitution and sustainable development in India
- **Medical ethics**: Definition, goal, scope Code of conduct Basic principles of medical ethics, Confidentiality, malpractice and negligence Rational and irrational drug therapy Autonomy and informed consent Right of patients Care of the terminally ill Euthanasia Organ transplantation and Human transplantation act.
- **Medico legal aspects of medical records**: Medico legal case and type. Records and documents related to MLC Ownership of medical records Confidentiality Privilege communication Release of medical information Unauthorized disclosure Retention of medical records Professional indemnity insurance policy Development of standardized protocol to avoid near miss or sentinel events Informed consent

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4. Course Map (CO-PO-PSO Map)

	Programme Outcomes (POs)												Programme Specific Outcomes (PSOs)			
	PO -1	PO -2	PO -3	PO -4	PO -5	PO -6	PO -7	PO -8					PSO -1	PSO-2	PSO -3	PSO -4
CO-1							1						1			
CO-2	1			2	2								1			
CO-3							2							1		
CO-4							1						1			
CO-5							1						1			

3: Very Strong Contribution, 2: Strong Contribution, 1: Moderate Contribution

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.Course Teaching and Learning Methods

Teaching and Learning Methods	Duration in hours	Total Duration in Hours
Face to Face Lectures		25
Demonstrations		00
1.Demonstration using Videos	-	
2.Demonstration using Physical Models/ Systems	-	
3.Demonstration on a Computer	-	
Numeracy		00
1.Solving Numerical Problems	-	
Practical Work		00
1.Course Laboratory	-	
2. Computer Laboratory	-	
3.Engineering Workshop/Course/Workshop/Kitchen	-	
4.Clinical Laboratory	-	
5.Hospital	-	
6.Model Studio	-	
Others		00
1.Case Study Presentation	-	
2.Guest Lecture	-	
3. Industry/Field Visit	-	
4.Brain Storming Sessions	-	
5.Group Discussions	-	
6.Discussing Possible Innovations	-	
Written Examination (Mid-Term tests and SEE)		05
Total Duration in Hours		30

6. Method of Assessment

Theory Course CE			Theory Course SEE
SC1 (Written Assignment)	SC2 (Innovative assignment)	SC3 (Mid-term test)	40 marks
20 marks	20 Marks	20 Marks	

In CE there shall be three subcomponents of CE (SC1, SC2, and SC3), namely Mid Term; Written Assignment; Innovative assignments. Each subcomponent is evaluated individually accounting to 60% Weightage as indicated in Course Specifications. The innovative assignment subcomponents can be of any of the following types:

- Online Test

- Assignments/Problem Solving
- Field Assignment
- Open Book Test
- Portfolio
- Reports
- Case Study
- Group Task
- Laboratory / Clinical Work Record
- Computer Simulations
- Creative Submission
- Virtual Labs
- Viva / Oral Exam
- Lab Manual Report
- Any other

After the three subcomponents are evaluated, the CE component marks are consolidated to attain 60% Weightage. The Semester End Examination shall be a 2-hour theory paper of 50 marks with a weightage of 40% in case of theory courses. In summary, the ratio of Formative (Continuous Evaluation-CE) Vs Summative (Semester End Examination-SEE) should be 60:40.

8. Achieving learning outcomes

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The following skills are directly or indirectly imparted to the students in the following teaching and learning methods:

SL.no	Curriculum and Capabilities Skills	How imparted during the course
1.	Knowledge	Class room lectures
2.	Understanding	Class room lectures
3.	Critical Skills	Class room lectures
4.	Analytical Skills	Group discussion
5.	Problem Solving Skills	Case discussions
6.	Practical Skills	Case discussions
7.	Group Work	case study and group discussions
8.	Self-Learning	Seminars
9.	Written Communication Skills	Examination
10.	Verbal Communication Skills	Group discussions
11.	Presentation Skills	Seminars, Case discussions
12.	Behavioral Skills	Group discussion, Case discussions
13.	Information Management	Case discussions
14.	Leadership Skills	Group discussions

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9. Course Resources

1. Essential Reading

Recommended reading:

- Class Notes
- Donnelly, J. (1998) International Human Rights, 2nd edn, WestviewPress
- J.C. Johari: The Constitution of India- A Politico-Legal Study-Sterling Publication, Pvt. Ltd.NewDelhi.
- J.N . Pandey: Constitution Law of India, Allahbad, Central Law Agency,1998.
- Granville Austin: The Indian Constitution - Corner Stone of a Nation-Oxford, New Delhi, 2000.
- Perry, M. (1998) The Idea of Human Rights, Oxford UniversityPress
- K Swamyraj (2017), Law of Contract (General Principles), God's Grace Publication, New Delhi
- D DBasu (1983), Constitutional Law of India, Lexis Nexis Butter worths Publication, Nagpur
- Introduction to Intellectual Property Theory and Practice (1997), World Intellectual Pr Organisation,Geneva
- Smith, R. (2007) Textbook on international human rights 3rd edn, Oxford University Press

Magazines and Journals Websites

- http://industrialrelations.naukrihub.com/industrial-relation-policy.html
- http://labour.nic.in/
- http://whitepapers.businessweek.com/tlist/Legal-Environment.html

Other ElectronicResources

Electronic resources on the course area are available on MSRUASlibrary

Course name		Constitution of India
Course code		AHN203A
Course Leader/s Name		
Course Leader Contact Details	**Phone:**	080 – 49065555
	E- mail:	
Course Specifications Approval		June 2022
Next Course Specifications Review		June 2026

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Course Specifications: Directed clinical education – III

Course Title	Directed clinical education – III
Course Code	DTC206A
Department	Allied Health Science
Faculty	Faculty of Life and Allied Health Sciences

I. Course Summary

1. Aim and Summary

The course aims to impart basic knowledge and additional skills in clinical procedures, instead reaction with patients and professional personnel. Students apply knowledge from previous clinical learning experiences under the supervision of a nephrologist or senior Dialysis Therapy Technologist. Students are tested on intermediate clinical dialysis therapy technology skills including hemodialysis and peritoneal dialysis Therapy

2. Course Size and Credits:

Number of credits	10
Total hours of class room interaction during the semester	
Number of practical/tutorial hours	300
Number of semester weeks	16
Department responsible	Allied Health Sciences
Course evaluation	Total Marks: 100
Pass requirement	As per the Academic Regulations
Attendance requirement	As per the Academic Regulations

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II. Teaching, Learning and Assessment

1. Course Outcomes (CO)

Upon completion of this course students will be able to:

No.	Course Outcomes
1.	Demonstrate the competencies acquired for patient preparation, equipment handing and operation
2.	Demonstrate the ability to start hemodialysis, peritoneal dialysis in different patient population including pediatric population
3.	Demonstrate A-V cannulation
4.	Operate hemodialysis machines, CAPD cylers reuse machines independently
5.	Start and close hemodialysis sessions independently
6	Train patients to independently perform peritoneal dialysis

2. Course Contents:

To achieve final competency substantial time will be spent : Setting up multi field techniques under supervision. Participating in the quality control procedures in the department in accordance withthe protocols. Simulating and localizing a target volume. Discussing the role of local rules and outline those in place in the differentdepartments
Pre –Dialysis and post Dialysis assessments • Dialysis machine connection and disconnection • Monitoring during Dialysis • Checking Vital signs • Priming of the extracorporeal circuit • Assemble and demonstrate extracorporeal blood circuit • Assisting in hemodialysis procedures • Preparation of dialysis solutions-Bicarbonate and acid concentration • dialysis fluid composition and steps of preparation • Prepare dialysis fluid according to the protocol and documentation • Identify and solve the minor technical problems occurring due to improper dialysis fluid preparation, handling and usage

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- Demonstrate Hand wash techniques
- Wearing personal protective equipment
- Dialysis catheter dressing and removal
- Starting dialysis with catheter
- Hemodialysis catheter removal
- Disinfection
- Types of disinfectants used in the HD unit
- Disinfectants used in the dialysis reprocessing area
- Disinfectants used in other areas of the dialysis unit
- Handling of Hemodialysis machine alarms
- HD initiation and termination through the catheter
- Performing PD exchanges manually/cycler device
- Assist to do the cannulation procedure and Decannulation procedure
- Manage anticoagulation on patients during dialysis

3. Course Map (CO-PO-PSO Map)

	Programme Outcomes (POs)												Programme Specific Outcomes (PSOs)			
	PO -1	PO -2	PO -3	PO -4	PO -5	PO -6	PO -7	PO -8	PO -9	PO -10	PO -11	PO -12	PSO -1	PSO -2	PSO -3	PSO -4
CO-1	3				1								1		1	
CO-2	3		2				2							1		
CO-3	3							1					1			
CO-4	3	2			2									3		
CO-5	3			1			1									1
CO-6	3	1		1			1						2	1		
3: Very Strong Contribution, 2: Strong Contribution, 1: Moderate Contribution																

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Approved by the Academic Council at its 26th meeting held on 14 July 2022

4. Course Teaching and Learning Methods

Teaching and Learning Methods	Duration in hours	Total Duration in Hours
Face to Face Lectures		
Demonstrations		
10. Demonstration using Videos		
2. Demonstration using Physical Models/ Systems		
3. Demonstration on a Computer		
Numeracy		
1. Solving Numerical Problems		
Practical Work		
1. Course Laboratory	40	
2. Computer Laboratory		
3. Engineering Workshop/Course Workshop/Kitchen		220
4. Clinical Laboratory		
5. Hospital	180	
6. Model Studio		
Others		
1. Case Study Presentation	10	
2. Guest Lecture		
3. Industry/Field Visit		10
4. Brain Storming Sessions		
5. Group Discussions		
6. Discussing Possible Innovations		
Written Examination (Mid-Term tests and SEE)		10
Total Duration in Hours		240

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5. Method of Assessment

The following is the CE components:

Component CE	
SC1 (Log book)	SC2 (VivaVoce)
50 Marks	50 Marks

In CE there shall be two subcomponents of CE (SC1, SC2,), namely log book and viva-voce assessment. Eachsubcomponent is evaluated individually accounting to 100% Weightage as indicated in Course Specifications

6. Achieving learning outcomes

The following skills are directly or indirectly imparted to the students in the following teaching and learning methods:

S.No	Curriculum and Capabilities	How imparted during the course
1.	Knowledge	Class room lectures
2.	Understanding	Class room lectures
3.	Critical Skills	Class room lectures
4.	Analytical Skills	Group discussion
5.	Problem Solving Skills	Case discussions
6.	Practical Skills	Case discussions
7.	Group Work	case study and group discussions
8.	Self-Learning	Seminars
9.	Written Communication Skills	Examination
10.	Verbal Communication Skills	Group discussions
11.	Presentation Skills	Seminars, Case discussions
12.	Behavioral Skills	Group discussion, Case discussions
13.	Information Management	Case discussions
14.	Leadership Skills	Group discussions

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III. Course Resources

a. Essential Reading

- Class notes
- Clinical Manual
- John T. Daugirdas, Peter G. Blake, Todd S. Ing . Handbook of Dialysis, 5th edition (2014), Lippincott Williams and Wilkins.
- Allen R. Nissenson ,Richard N. Fine Dialysis Therapy 3 edition (2001) Hanley & Belfus
- R. Gokal, Ramesh Khanna, Raymond T. Krediet , K.D. Nolph. Textbook of Peritoneal –Dialysis 2nd ed. edition (2000) Springer.
- Text book of Nephrology –Oxford and Brenner Rector (Reference only)

b. Recommended Reading

- R. Gokal, Ramesh Khanna, Raymond T. Krediet , K.D. Nolph. Textbook of Peritoneal –Dialysis 2nd ed. edition (2000) Springer.
- Text book of Nephrology –Oxford and Brenner Rector (Reference only)

c. Magazines and Journals

- Journal of Renal disorders and management
- Hemodialysis techniques

d. Websites

IV. Course Organization

Course Code		DTC206A
Course Title		Directed Clinical Education III
Course Leader/s Name		
Course Leader Contact Details	**Phone:**	080 – 49065555
	E- mail:	
Course Specifications Approval		
Next Course Specifications Review		

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Course Specifications: Techniques in Peritoneal Dialysis

Course Title	Techniques in Peritoneal Dialysis
Course Code	DTC301A
Department	Allied Health Science
Faculty	Faculty of Life and Allied Health Sciences

I. Course Summary

1. Aim and Summary

The course aims to impart knowledge on peritoneal dialysis and its role in health and diseases, the courseis designed to provide an understanding of peritoneal dialysis in chronic kidney disease. The students areoriented to peritoneal apparatus physiological difference and nutritional support with special emphasis on parental nutrition. Students learn about sample collection, and the different PD apparatus used. They will perform routine PD exchange procedures and blood investigations and interpret and diagnose abnormalities

2. Course Size and Credits:

Number of credits	4
Total hours of classroom interactionduring the semester	30
Number of practical/tutorial hours	60/20
Number of semester weeks	16
Department responsible	Allied Health Sciences
Course evaluation	Total Marks: 100
Pass requirement	As per the Academic Regulations
Attendance requirement	As per the Academic Regulations

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II. Teaching, Learning and Assessment

1. Course Outcomes (CO)

Upon completion of this course students will be able to:

No.	Course Outcomes
1.	Explain the principles and apparatus used in peritoneal dialysis
2.	Describe the CAPD and APD procedure
3.	Explain the adequacy and prescription for peritoneal dialysis
4.	Describe the infectious and non-infectious complications in peritoneal dialysis
5.	Demonstrate the use, care and maintenance of various instruments used in peritoneal dialysis
6	Interpret the peritoneal equilibrium test in APD and CAPD

2. Course Contents:

Course Content	
1.	Physiology of Peritoneal Dialysis
2.	Modes of peritoneal dialysis
3.	Apparatus for Peritoneal Dialysis
4.	Peritoneal Dialysis Catheters, Placement, and Care
5.	Insertion of peritoneal dialysis catheters
6.	Peritoneal Dialysis for the Treatment of Acute Kidney Injury
7.	Peritoneal Dialysis Techniques
•	Continuous Ambulatory Peritoneal Dialysis (CAPD)
•	Automated Peritoneal Dialysis (APD)
8.	Peritoneal dialysate: standard fluid composition
9.	Adequacy of Peritoneal Dialysis and Chronic Peritoneal Dialysis Prescription
10.	Peritoneal equilibration test and modelling
11.	Complications of Peritoneal Dialysis
12.	Volume Status and Fluid Overload in Peritoneal Dialysis
13.	Peritonitis and Exit-Site Infection
14.	Hernias, Leaks, and Encapsulating Peritoneal Sclerosis
15.	Metabolic, Acid-Base, and Electrolyte Aspects of Peritoneal Dialysis
16.	Causes, Diagnosis, and Treatment of Peritoneal Membrane Failure
17.	Nutritional Issues
Practical	

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1.	The performing procedure of peritoneal dialysis
2.	Insertion of peritoneal dialysis catheters
3.	Pre-operative preparation for peritoneal catheter insertion
4.	Peritoneal dialysis catheter insertion technique
5.	Malfunctioning catheters
6.	Investigation and management of malfunctioning catheters
7.	Repositioning peritoneal dialysis catheters
8.	Technique for performing the peritoneal equilibration test
9.	Performing an exit site dressing
10.	Pre-operative assessment for peritoneal dialysis patients
11.	Post-operative management for peritoneal dialysis patients
12.	Performing exchange procedure using non-dextrose dialysate
13.	Operating APD machines

3. Course Map (CO-PO-PSO Map)

	Programme Outcomes (POs)												Programme Specific Outcomes (PSOs)			
	PO -1	PO -2	PO -3	PO -4	PO -5	PO -6	PO -7	PO -8	PO -9	PO -10	PO -11	PO -12	PSO -1	PSO -2	PSO -3	PSO -4
CO-1	3			2					1			1	3			2
CO-2		2								3				2		
CO-3		3			3				2		2		2	3		
CO-4	3		3						3				3		3	
CO-5			2							2					2	
CO-6		2							1					2		
3: Very Strong Contribution, 2: Strong Contribution, 1: Moderate Contribution																

4. Course Teaching and Learning Methods

Teaching and Learning Methods	Duration in hours	Total Duration in Hours
Face to Face Lectures		26
Demonstrations		
11. Demonstration using Videos		
2. Demonstration using Physical Models/ Systems	04	
3. Demonstration on a Computer		
Numeracy		
1. Solving Numerical Problems		
Practical Work		
1. Course Laboratory	08	
2. Computer Laboratory		

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3. Engineering Workshop/Course Workshop/Kitchen		42
4. Clinical Laboratory		
5. Hospital	30	
6. Model Studio		
Others		12
1. Case Study Presentation	10	
2. Guest Lecture		
3. Industry/Field Visit		
4. Brain Storming Sessions		
5. Group Discussions	02	
6. Discussing Possible Innovations		
Written Examination (Mid-Term tests and SEE)		10
Total Duration in Hours		90

5. Method of Assessment

The following is the CE components:

Theory Course CE			**Theory Course SEE**
SC1 (Written Assignment)	SC2 (Assignment)	SC3 (Mid-term test)	40 marks
20 marks	20 Marks	20 Marks	

In CE there shall be three subcomponents of CE (SC1, SC2, and SC3), namely Mid Term; Written Assignment; Innovative assignments. Each subcomponent is evaluated individually accounting to 60% Weightage as indicated in Course Specifications. The innovative assignment subcomponents can be of any of the following types:

a) Online Test
b) Assignments/Problem Solving
c) Field Assignment
d) Open Book Test
e) Portfolio
f) Reports
g) Case Study
h) Group Task
i) Laboratory / Clinical Work Record
j) Computer Simulations
k) Creative Submission
l) Virtual Labs
m) Viva / Oral Exam
n) Lab Manual Report
o) Any other

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After the three subcomponents are evaluated, the CE component marks are consolidated to attain 60% Weightage. The Semester End Examination shall be a 2-hour theory paper of 50 marks with a weightage of 40% in case of theory courses.In summary, the ratio of Formative (Continuous

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Evaluation-CE) Vs Summative (Semester End Examination-SEE) should be 60:40.Achieving learning outcomes

6. Achieving learning outcomes

The following skills are directly or indirectly imparted to the students in the following teaching and learning methods:

S.No	Curriculum and Capabilities	How imparted during the course
1.	Knowledge	Class room lectures
2.	Understanding	Class room lectures
3.	Critical Skills	Case study and group discussions
4.	Analytical Skills	Group discussion
5.	Problem Solving Skills	Case discussions
6.	Practical Skills	Case discussions
7.	Group Work	Case study and group discussions
8.	Self-Learning	Seminars
9.	Written Communication Skills	Examination
10.	Verbal Communication Skills	Group discussions
11.	Presentation Skills	Case discussions ,Seminars
12.	Behavioral Skills	Group discussion, Case discussions
13.	Information Management	Case discussions
14.	Leadership Skills	Group discussions

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III. Course Resources

1. Essential Reading

- Class notes
- Clinical Manual
- John T. Daugirdas, Peter G. Blake, Todd S. Ing . Handbook of Dialysis, 5th edition (2014),Lippincott Williams and Wilkins.
- Allen R. Nissenson ,Richard N. Fine Dialysis Therapy 3 edition (2001) Hanley & Belfus
- R. Gokal, Ramesh Khanna, Raymond T. Krediet , K.D. Nolph. Textbook of Peritoneal –Dialysis 2nd ed. edition (2000) Springer.
- Text book of Nephrology –Oxford and Brenner Rector (Reference only)

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2. Recommended Reading

- R. Gokal, Ramesh Khanna, Raymond T. Krediet , K.D. Nolph. Textbook of Peritoneal –Dialysis 2nd ed. edition (2000) Springer.
- Text book of Nephrology –Oxford and Brenner Rector (Reference only)

3. Magazines and Journals

- Websites Journal of Renal disorders and management
- Peritoneal techniques

4. Websites

IV. Course Organization

Course Code		DTC301A
Course Title		Techniques in Peritoneal Dialysis
Course Leader/s Name		
Course Leader Contact Details	**Phone:**	080 – 49065555
	E- mail:	
Course Specifications Approval		
Next Course Specifications Review		

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Course Specifications: Clinical Practice Guidelines in Dialysis

Course Title	Clinical Practice Guidelines in Dialysis
Course Code	DTC302A
Department	Allied Health Science
Faculty	Faculty of Life and Allied Health Sciences

I. Course Summary

1. Aim and Summary

The course aims to impart knowledge on Guidelines in Dialysis and its role in health and diseases, the course is designed to provide an understanding of guidelines in chronic kidney disease. The students are oriented to clinical practices. Students learn about all the hemodialysis and peritoneal dialysis guidelines.They will practice routine guidelines and based on performing the procedures

2. Course Size and Credits:

Number of credits	2
Total hours of class room interaction during the semester	30
Number of practical/tutorial hours	00
Number of semester weeks	16
Department responsible	Allied Health Sciences
Course evaluation	Total Marks: 50
Pass requirement	As per the Academic Regulations
Attendance requirement	As per the Academic Regulations

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II. Teaching, Learning and Assessment

1. Course Outcomes (CO)

Upon completion of this course students will be able to:

No.	Intended Learning Outcomes
1.	Explain the KDOQI and KDIGO guidelines
2.	Describe the guidelines for adequacy in both HD and PD
3.	Explain the guidelines for CKD evaluation
4.	What guidelines should or should not be: implications for guideline production
5.	Endorsement of the KDIGO guidelines on kidney transplantation

2. Course Contents:

Course Content
Overview of guidelines • Anaemia in CKD • Assessment of potential kidney transplant recipients • Blood borne viruses • Cardiovascular disease in CKD • CKD-mineral and bone disorders • Detection monitoring and care of patients with CKD • Haemodialysis • Nutrition in CKD • Peritoneal access • Peritoneal dialysis • Planning, initiation and withdrawal of RRT • Post-operative care of kidney transplant recipients • Water treatment facilities, dialysis water and dialysis fluid quality • Vascular access for haemodialysis. KDOQI and KDIGO guidelines Diabetes and CKD • Anaemia in CKD • CKD evaluation • Bone metabolism and disease in CKD • Hypertension in CKD • Dyslipidaemia in CKD • Nutrition in children with CKD • H D adequacy • PD adequacy • Vascular access • CV disease in dialysis patients European Renal Best Practice International Society of Peritoneal Dialysis Measurement for adequacy of PD and HD

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Vascular access – KDOQI guidelines Monitoring of HD and CAPD patients- KDOQI guidelines Cardiovascular disease in dialysis patients- KDOQI guidelinesAnaemia in dialysis patients - KDOQI guidelines Bone disease in dialysis patients - KDOQI guidelinesKidney transplantation- KDOQI guidelines Endorsement of the KDIGO CKD–MBD guidelines

3. Course Map (CO-PO-PSO Map)

	Programme Outcomes (POs)												Programme Specific Outcomes (PSOs)			
	PO -1	PO -2	PO -3	PO -4	PO -5	PO -6	PO -7	PO -8	PO -9	PO -10	PO -11	PO -12	PSO -1	PSO -2	PSO -3	PSO -4
CO-1	1								1				1			
CO-2	2		1							2		1	2		1	
CO-3		3			1				1					3		
CO-4	1										3		1			
CO-5			2	3						2					2	3
3: Very Strong Contribution, 2: Strong Contribution, 1: Moderate Contribution																

4. Course Teaching and Learning Methods

Teaching and Learning Methods	Duration in hours	Total Duration in Hours
Face-to-Face Lectures		20
Demonstrations		
12. Demonstration using Videos		
2. Demonstration using Physical Models/ Systems		
3. Demonstration on a Computer		
Numeracy		
1. Solving Numerical Problems		
Practical Work		
1. Course Laboratory	08	
2. Computer Laboratory		
3. Engineering Workshop/Course Workshop/Kitchen		
4. Clinical Laboratory		
5. Hospital		
6. Model Studio		
Others		

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Approved by the Academic Council at its 26th meeting held on 14 July 2022

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1. Case Study Presentation		
2. Guest Lecture		
3. Industry/Field Visit		
4. Brain Storming Sessions		
5. Group Discussions		
6. Discussing Possible Innovations		
Written Examination (Mid-Term tests and SEE)		02
Total Duration in Hours		30

5. Method of Assessment

The following is the CE components:

Theory Course CE			**Theory Course SEE**
SC1 (Written Assignment)	SC2 (Assignment)	SC3 (Mid-term test)	40 marks
20 marks	20 Marks	20 Marks	

In CE there shall be three subcomponents of CE (SC1, SC2, and SC3), namely Mid Term; Written Assignment; Innovative assignments. Each subcomponent is evaluated individually accounting to 60% Weightage as indicated in Course Specifications. The innovative assignment subcomponents can be of any of the following types:

p) Online Test
q) Assignments/Problem Solving
r) Field Assignment
s) Open Book Test
t) Portfolio
u) Reports
v) Case Study
w) Group Task
x) Laboratory / Clinical Work Record
y) Computer Simulations
z) Creative Submission
aa) Virtual Labs
bb) Viva / Oral Exam
cc) Lab Manual Report
dd) Any other

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After the three subcomponents are evaluated, the CE component marks are consolidated to attain 60% Weightage. The Semester End Examination shall be a 2-hour theory paper of 50 marks with a weightage of 40% in case of theory courses.In summary, the ratio of Formative (Continuous Evaluation-CE) Vs Summative (Semester End Examination-SEE) should be 60:40.

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6. Achieving learning outcomes

The following skills are directly or indirectly imparted to the students in the following teaching and learning methods:

S.No	Curriculum and Capabilities	How imparted during the course
1.	Knowledge	Class room lectures
2.	Understanding	Class room lectures
3.	Critical Skills	Class room lectures
4.	Analytical Skills	Group discussion
5.	Problem Solving Skills	Case discussions
6.	Practical Skills	Case discussions
7.	Group Work	case study and group discussions
8.	Self-Learning	Seminars
9.	Written Communication Skills	Examination
10.	Verbal Communication Skills	Group discussions
11.	Presentation Skills	Seminars, Case discussions
12.	Behavioral Skills	Group discussion, Case discussions
13.	Information Management	Case discussions
14.	Leadership Skills	Group discussions

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III. Course Resources

a. Essential Reading

- John T. Daugirdas, Peter G. Blake, Todd S. Ing . Handbook of Dialysis, 5th edition (2014), Lippincott Williams and Wilkins
- Oxford Handbook of Dialysis FOURTH EDITION
- Allen R. Nissenson ,Richard N. Fine Dialysis Therapy 3 edition (2001) Hanley & Belfus
- R. Gokal, Ramesh Khanna, Raymond T. Krediet , K.D. Nolph. Textbook of Peritoneal –Dialysis 2nd ed. edition (2000) Springer.
- Text book of Nephrology –Oxford and Brenner Rector (Reference only)

b. Recommended Reading

- R. Gokal, Ramesh Khanna, Raymond T. Krediet , K.D. Nolph. Textbook of Peritoneal –Dialysis 2nd ed. edition (2000) Springer.
- Text book of Nephrology –Oxford and Brenner Rector (Reference only)

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c. Magazines and Journals

- Journal of Renal disorders and management
- www.kidney.org/professionals/KDOQI/guidelines_commentaries

d. Websites

- www.renal.org.
- www.kdigo.org

IV. Course Organization

Course Code		DTC302A
Course Title		Clinical Practice Guidelines in Dialysis
Course Leader/s Name		
Course Leader Contact Details	**Phone:**	080 – 49065555
	E- mail:	
Course Specifications Approval		
Next Course Specifications Review		

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Course Specifications: Nutrition in Renal Diseases

Course Title	Nutrition in Renal Disease
Course Code	DTC303A
Department	Allied Health Science
Faculty	Faculty of Life and Allied Health Sciences

I. Course Summary

1. Aim and Summary

This course covers the basic aspects of Nutrition for good health. It also includes nutrients and nutrient derivatives relevant to ocular health, nutrition deficiency and ocular disease, Nutrition and ocular aging,and contraindications, adverse reactions and ocular nutritional supplements.

At the end of the course student would have gained the knowledge of the following:

• Balanced diet. • Protein, carbohydrates, vitamins, Minerals, carotenoids and eye. • Nutrition and Ocular aging • Adverseeffects of ocular nutritional supplements.

2. Course Size and Credits:

Number of credits	2
Total hours of class room interaction during the semester	30
Number of practical/tutorial hours	00
Number of semester weeks	16
Department responsible	Allied Health Sciences
Course evaluation	Total Marks: 50
Pass requirement	As per the Academic Regulations
Attendance requirement	As per the Academic Regulations

II. Teaching, Learning and Assessment

1. Course Outcomes (CO)

Upon completion of this course students will be able to:

No.	Course Outcomes
1.	Define the concepts of balanced diet and its importance
2.	Discuss the functions of food and diet-based disorders

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3.	Brief about RDA and its role in diet planning
4.	Explain the functions of carbohydrates, proteins and lipids
5.	Elaborate on the importance of assessing nutritional status
6.	Describe the role of nutrition in CKD patients

2. Course Contents:

Course Content
Introduction. 1.1 History of Nutrition 1.2 Nutrition as a science 1.3 Food groups, RDA 1.4 Balanced diet, diet planning. 1.5 Assessment of nutritional status **2. Energy** 2.1 Units of energy. 2.2 Measurements of energy and value of food 2.3 Energy expenditure. 2.4 Total energy/calorie requirement for different age groups and diseases. 2.5 Satiety value 2.6 Energy imbalance- obesity, starvation. 2.7 Limitations of the daily food guide. **3. Proteins** 3.1 Sources and functions 3.2 Essential and non- essential amino- acids. 3.3 Incomplete and complete proteins 3.4 Supplementary foods. 3.5 PEM and the eye 3.6 Nitrogen balance 3.7 Changes in protein requirement. **4. Fats** 4.1 Sources and functions 4.2 Essential fatty acids 4.3 Excess and deficiency 4.4 Lipids and the eye. 4.5 Hyperlipidemia, heart diseases, atherosclerosis.

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5. Minerals
5.1 General functions and sources
5.2 Macro and micro minerals associated with the eye.
5.3 Deficiencies and excess –ophthalmic complications (e.g. iron, calcium, iodine etc.)
6. Vitamins
6.1 General functions, and food sources
6.2 Vitamin deficiencies and associated eye disorders with particular emphasis to VitaminA
6.3 Promoting sound habits in pregnancy, lactation and infancy.
6.4 Nutrient with antioxidant.
6.5 Properties
6.6 Digestion of Proteins, carbohydrates & lipids
7. Essential amino acids.
8. Nutrition in CKD and Haemodialysis patients
8.1 Nutritional assessment in CKD
8.2 Nutrition in CAPD
8.3 Nutrition in AKI

3. Course Map (CO-PO-PSO Map)

	Programme Outcomes (POs)												Programme Specific Outcomes (PSOs)			
	PO -1	PO -2	PO -3	PO -4	PO -5	PO -6	PO -7	PO -8	PO -9	PO -10	PO -11	PO -12	PSO -1	PSO -2	PSO -3	PSO -4
CO-1							1						1			
CO-2		1			1			1						2		
CO-3			1			1									1	
CO-4							1							1		
CO-5	2															2
CO-6	1		1			1							1			
3: Very Strong Contribution, 2: Strong Contribution, 1: Moderate Contribution																

4. Course Teaching and Learning Methods

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Teaching and Learning Methods	Duration in hours	Total Duration in Hours
Face-to-Face Lectures		14
Demonstrations		10
13. Demonstration using Videos		
2. Demonstration using Physical Models/ Systems	10	
3. Demonstration on a Computer		

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Numeracy		
1. Solving Numerical Problems		
Practical Work		
1. Course Laboratory		
2. Computer Laboratory		
3. Engineering Workshop/Course Workshop/Kitchen		
4. Clinical Laboratory		
5. Hospital		
6. Model Studio		
Others		
1. Case Study Presentation		
2. Guest Lecture		
3. Industry/Field Visit		
4. Brain Storming Sessions		
5. Group Discussions		
6. Discussing Possible Innovations		
Written Examination (Mid-Term tests and SEE)		06
Total Duration in Hours		30

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5. Method of Assessment

The following is the CE components:

Theory Course CE			Theory Course SEE
SC1 (Written Assignment)	SC2 (Assignment)	SC3 (Mid-term test)	40 marks
20 marks	20 Marks	20 Marks	

In CE there shall be three subcomponents of CE (SC1, SC2, and SC3), namely Mid Term; Written Assignment; Innovative assignments. Each subcomponent is evaluated individually accounting to 60% Weightage as indicated in Course Specifications. The innovative assignment subcomponents can be of any of the following types:

a) Online Test
b) Assignments/Problem Solving
c) Field Assignment
d) Open Book Test
e) Portfolio
f) Reports
g) Case Study
h) Group Task
i) Laboratory / Clinical Work Record
j) Computer Simulations
k) Creative Submission
l) Virtual Labs
m) Viva / Oral Exam
n) Lab Manual Report
o) Any other

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After the three subcomponents are evaluated, the CE component marks are consolidated to attain 60% Weightage. TheSemester End Examination shall be a 2-hour theory paper of 50 marks with a weightage of 40% in case of theory courses.

In summary, the ratio of Formative (Continuous Evaluation-CE) Vs Summative (Semester End Examination-SEE)should be 60:40.

6. Achieving learning outcomes

The following skills are directly or indirectly imparted to the students in the following teaching and learning methods:

S.No	Curriculum and Capabilities	How imparted during the course
1	Knowledge	Class room lectures
2	Understanding	Class room lectures

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3.	Critical Skills	Class room lectures
4.	Analytical Skills	Group discussion
5.	Problem Solving Skills	Case discussions
6.	Practical Skills	Case discussions
7.	Group Work	case study and group discussions
8.	Self-Learning	Seminars
9.	Written Communication Skills	Examination
10.	Verbal Communication Skills	Group discussions
11.	Presentation Skills	Seminars, Case discussions
12.	Behavioral Skills	Group discussion, Case discussions
13.	Information Management	Case discussions
14.	Leadership Skills	Group discussions

III. Course Resources

a. Essential Reading

- Course notes

b. Recommended Reading

- M Swaminathan: Hand book of Food and Nutrition, fifth edition, Bangalore printing & publishing Co.Ltd, Bangalore, 2004
- C Gopalan, BV Rama Sastri, SC Balasubramanian: Nutritive Value of Indian Foods, National Institute of Nutrition, ICMR, Hyderabad,2004
- Frank Eperjesi & Stephen Beatty: Nutrition and the Eye A practical Approach, Elsevier Butterworth-
- Heinemann, USA, 2006
- Heinemann, USA, 2006

c. Magazines and Journals

- Journal of Renal disorders and management

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IV. Course Organization

Course Code		DTC303A
Course Title		Nutrition in Renal Disease
Course Leader/s Name		
Course Leader Contact Details	**Phone:**	080 – 49065555
	E- mail:	
Course Specifications Approval		
Next Course Specifications Review		
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Course Specifications: Directed clinical education – IV

Course Title	Directed clinical education – IV
Course Code	DTC304A
Department	Allied Health Science
Faculty	Faculty of Life and Allied Health Sciences

I. Course Summary

1. Aim and Summary

This course aims to impart basic knowledge and additional skills in clinical procedures, interaction with patients and professional personnel. Students apply knowledge from previous clinical learning experience under the supervision of a nephrologist or senior Dialysis Therapy Technologist. Students aretested on intermediate clinical dialysis therapy technology skills including hemodialysis and peritoneal and peritoneal dialysis Therapy

2. Course Size and Credits:

Number of credits	10
Total hours of class room interaction during the semester	0
Number of practical/tutorial hours	300
Number of semester weeks	16
Department responsible	Allied Health Sciences
Course evaluation	Total Marks: 100
Pass requirement	As per the Academic Regulations
Attendance requirement	As per the Academic Regulations

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II. Teaching, Learning and Assessment

1. Course Outcomes (CO)

Upon completion of this course students will be able to:

No.	Course Outcomes
1.	Demonstrate the competencies acquired for patient preparation, equipment handing and operation under supervision
2.	Assist in starting hemodialysis, and peritoneal dialysis in different patient population including pediatric population
3.	Demonstrate the reprocessing procedure
4.	Operate hemodialysis machines, CAPD cyclers reuse machines under supervision
5.	Able to do management of technical and non-technical complications during hemodialysis and peritoneal dialysis

2. Course Contents:

Course Content tasks Under Supervision
To achieve final competency substantial time will be spent : Setting up multi field techniques under supervision. Participating in the quality control procedures in the department in accordance with theprotocols. Simulating and localizing a target volume. Discussing the role of local rules and outline those in place in the differentdepartments
Dialyzer reuse • Maintenance and dilution of chemicals • Dialyzer reprocessing manually and automated (using reuse machine) **Manage anticoagulation on patients on dialysis** • Using citrate anticoagulant in dialysis • Using and Management of overdose of heparin **Initiation of dialysis through central venous temporary and tunnelled catheters** Internal jugular and femoral • Catheter dressing • Starting/termination of dialysis • Decannulation • Successfully cannulate arterio-venous fistulae for hemodialysis • Single needle dialysis settings • Pre and Post dialysis sample collections • Machine disinfection

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- Isolated ultrafiltration settings
- Performing PD exchanges manually/cycler device
- Train patients and their caregivers in performing peritoneal dialysis
- Performing the PET test

Performing in various special groups

- Unstable patients in The intensive care unit,
- Children,
- Cardiac patient,
- Patients with congestive cardiac failure.
- Patients positive for HIV, HBsAg & HCV.
- Poisoning cases.
- Pregnancy
- Dialysis in infants & children.

3. Course Map (CO-PO-PSO Map)

	Programme Outcomes (POs)												Programme Specific Outcomes (PSOs)			
	PO -1	PO -2	PO -3	PO -4	PO -5	PO -6	PO -7	PO -8	PO -9	PO -10	PO -11	PO -12	PSO -1	PSO -2	PSO -3	PSO -4
CO-1	3															3
CO-2		1					1							3		
CO-3				1		1							3			
CO-4					2			1					3			
CO-5	3						1						3			
3: Very Strong Contribution, 2: Strong Contribution, 1: Moderate Contribution																

4. Course Teaching and Learning Methods

Teaching and Learning Methods	Duration in hours	Total Duration in Hours
Face-to-Face Lectures		
Demonstrations		10
14. Demonstration using Videos		
2. Demonstration using Physical Models/ Systems	10	
3. Demonstration on a Computer		
Numeracy		
1. Solving Numerical Problems		
Practical Work		

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1. Course Laboratory	10	180
2. Computer Laboratory		
3. Engineering Workshop/Course Workshop/Kitchen		
4. Clinical Laboratory	10	
5. Hospital	160	
6. Model Studio		
Others		40
1. Case Study Presentation	10	
2. Guest Lecture		
3. Industry/Field Visit	10	
4. Brain Storming Sessions	10	
5. Group Discussions	10	
6. Discussing Possible Innovations		
Written Examination (Mid-Term tests and SEE)		10
Total Duration in Hours		240

5. Method of Assessment

The following is the CE components:

Component CE	
SC1 (Log book)	SC2 (Viva Voce)
50 Marks	50 Marks

In CE there shall be two subcomponents of CE (SC1, SC2,), namely log book and viva-voce assessment. Eachsubcomponent is evaluated individually accounting to 100% Weightage as indicated in Course Specifications

.

6. Achieving learning outcomes

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The following skills are directly or indirectly imparted to the students in the following teaching and learning methods:

S.No	Curriculum and Capabilities	How imparted during the course
1.	Knowledge	Class room lectures
2.	Understanding	Class room lectures
3.	Critical Skills	Class room lectures
4.	Analytical Skills	Group discussion
5.	Problem Solving Skills	Case discussions

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6.	Practical Skills	Case discussions
7.	Group Work	case study and group discussions
8.	Self-Learning	Seminars
9.	Written Communication Skills	Examination
10.	Verbal Communication Skills	Group discussions
11.	Presentation Skills	Seminars, Case discussions
12.	Behavioral Skills	Group discussion, Case discussions
13.	Information Management	Case discussions
14.	Leadership Skills	Group discussions

III. Course Resources

a. Essential Reading

- Course notes
- Allen R. Nissenson,Richard N. Fine Dialysis Therapy 3 edition (2001) Hanley &Belfus
- R. Gokal, Ramesh Khanna, Raymond T. Krediet , K.D. Nolph ,Textbook of PeritonealDialysis(2000) Springer2nd ed. edition
- John T. Daugirdas , Peter G. Blake , Todd S. Ing , Handbook of Dialysis, 5th edition (2014),Lippincott Williams and Wilkins;
- NANT and Oxford -Text books of Dialysis for technologists

b. Recommended Reading

- Allen Nissenson Richard Fine, Handbook of Dialysis Therapy, 5th Edition(2016) Elsevier.
- William L. Henrich, Principles and Practice of Dialysis (Principles & Practice of Dialysis), 4thedition (2009) Lippincott Williams and Wilkins

c. Magazines and Journals

- Journal of Renal disorders and management

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d. Websites

- www.renal.org.
- Videos in the library

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IV. Course Organization

Course Code		DTC304A
Course Title		Directed Clinical Education-IV
Course Leader/s Name		
Course Leader Contact Details	**Phone:**	080 – 49065555
	E- mail:	
Course Specifications Approval		
Next Course Specifications Review		

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Course Specifications: Project Management

Course Title	Project Management
Course Code	AHM305A
Department	Directorate of Transferable Skills and Leadership Development
Faculty	Faculty of Life and Allied Health Sciences

1. Course Summary

1. Aim and Summary

With the advent of technology, changing business environments, varying economic conditions and prevailing political situations, a varied types of projects are being undertaken. This is seen in different segments such as infrastructure, construction, Information Technology, Manufacturing, Engineering, Health Care, Hospitality, Logistics and Services. Along with these, there is a big need for manpower with competencies in Managing different types and sizes of projects. A Project Management Professional equipped with,

- appropriate tools and techniques,
- an ability to apply appropriate methods and processes
- appropriate project leadership skills and
- a structured approach to manage a project in its entirety will be in a better position to
- ensure a project's defined success.

The course aims at imparting knowledge and developing competencies on various aspects of Project Management as per International Project Management Association's framework. This course also provides a glimpse of tools, techniques, methods and process for managing a project effectively. This course offers a structured approach which are derived from the experiences of a large number of successful global organizations.

2. Course Size and Credits:

Number of credits	03
Total hours of class room interaction during the semester	45
Number of practical hours	15
Number of semester weeks	16
Department responsible	Allied Health Sciences
Course evaluation	Total Marks: 50 The distribution of marks for theory and laboratory/clinical component for continuous and Semester end

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	examination is as per the Programme specification
Pass requirement	As per the Academic Regulations
Attendance requirement	As per the Academic Regulations

Teaching, Learning and Assessment

3. Course Outcomes (CO)

Upon completion of this course students will be able to:

No.	Course outcome
1.	**CO 1:** Explain the characteristics of projects, Operations and principles of Project Management
2.	**CO 2:** Discuss the Project Management Competency Elements as per PMA's Individual Competence Baseline Ver 4.0
3.	**CO 3:** Discuss the tools for Project Execution, Monitoring and control
4.	**CO 4:** Apply the tools for project planning and Create a Project Management Plan covering Project Charter, Work Breakdown Structure, Project Organisation, Time Management Plan and Risk Management Plan

4. Course Contents:

- **Section 1:** Introduction to Project, Programmes, Portfolio and Operations, Project Organization and Permanent Organization, Project Management Success, KRA, Creation of project, Need analysis, Business Case, Project Charter.
- **Section 2:** Requirements, Objectives & Benefits Scope WBS, Scope baseline, Change Management, Time Management, Lifecycle, AOA (ADM), AON (PDM), CPM, Floats, Network Exercises, Gantt Charts, Bar Charts, Resources, Resource Calendar
- **Section 3:** Controlling, Handling Changes, Phase end and Close out, Earned Value Management System, Variances, SPI & CPI, Numerical Exercises, Quality Management, Quality Planning, Quality Assurance, Quality Control, Quality Tools (Pareto Chart, Control Chart, Inspections, Benchmarking), Risk & Opportunity, Risk categories, Identification, Risk Analysis
- **Section 4:** Organization and Information, Stakeholder Management, Power and Interest, Culture and Values, Personal integrity and reliability, Personal communication, Communication Planning, Communication methods, Communication barriers, Conflict and crisis, Resourcefulness, Result Orientation

5. Course Map (CO-PO-PSO Map)

Approved by the Academic Council at its 26th meeting held on 14 July 2022

	Programme Outcomes (POs)												Programme Specific Outcomes (PSOs)			
	PO-1	PO-2	PO-3	PO-4	PO-5	PO-6	PO-7	PO-8					PSO-1	PSO-2	PSO-3	PSO-4
CO-1	3	1			2			2					3			1
CO-2	3	2						1					2		2	
CO-3	3							2					3	2		
CO-4	3	2		1	2		2	2					3	2		2
CO-5	3	3					2	3					3	2		2
3: Very Strong Contribution, 2: Strong Contribution, 1: Moderate Contribution																

6. Course Teaching and Learning Methods

Teaching and Learning Methods	Duration in hours	Total Duration in Hours
Face to Face Lectures		**20**
Demonstrations		**00**
1.Demonstration using Videos	-	
2.Demonstration using Physical Models/ Systems	-	
3.Demonstration on a Computer	-	
Numeracy		00
1.Solving Numerical Problems	-	
Practical Work		
1.Course Laboratory	-	
2. Computer Laboratory	-	
3.Engineering Workshop/Course/Workshop/Kitchen	-	
4.Clinical Laboratory	-	
5.Hospital	-	
6.Model Studio	-	
Others		**25**
1.Case Study Presentation	05	
2.Guest Lecture	-	
3. Industry/Field Visit	-	
4.Brain Storming Sessions	-	
5.Group Discussions	20	
6.Discussing Possible Innovations	-	

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Written Examination (Mid-Term tests and SEE)	**05**
Total Duration in Hours	**50**

7. Method of Assessment

Theory Course CE			Theory Course SEE
SC1 (Written Assignment)	SC2 (Innovative assignment)	SC3 (Mid-term test)	40 marks
20 marks	20 Marks	20 Marks	

In CE there shall be three subcomponents of CE (SC1, SC2, and SC3), namely Mid Term; Written Assignment; Innovative assignments. Each subcomponent is evaluated individually accounting to 60% Weightage as indicated in Course Specifications. The innovative assignment subcomponents can be of any of the following types:

- Online Test
- Assignments/Problem Solving
- Field Assignment
- Open Book Test
- Portfolio
- Reports
- Case Study
- Group Task
- Laboratory / Clinical Work Record
- Computer Simulations
- Creative Submission
- Virtual Labs
- Viva / Oral Exam
- Lab Manual Report
- Any other

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After the three subcomponents are evaluated, the CE component marks are consolidated to attain 60% Weightage. The Semester End Examination shall be a 2-hour theory paper of 50 marks with a weightage of 40% in case of theory courses. In summary, the ratio of Formative (Continuous Evaluation-CE) Vs Summative (Semester End Examination-SEE) should be 60:40.

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8. Achieving learning outcomes

The following skills are directly or indirectly imparted to the students in the following teaching and learning methods:

SL.no	Curriculum and Capabilities Skills	How imparted during the course
1.	Knowledge	Class room lectures
2.	Understanding	Class room lectures
3.	Critical Skills	Class room lectures
4.	Analytical Skills	Group discussion
5.	Problem Solving Skills	Case discussions
6.	Practical Skills	Case discussions
7.	Group Work	case study and group discussions
8.	Self-Learning	Seminars
9.	Written Communication Skills	Examination
10.	Verbal Communication Skills	Group discussions
11.	Presentation Skills	Seminars, Case discussions
12.	Behavioral Skills	Group discussion, Case discussions
13.	Information Management	Case discussions
14.	Leadership Skills	Group discussions

9. Course Resources

1. Essential Reading

- Course Notes
- Pinto Jeffrey K. (2019) Project Management: Achieving Competitive Advantage, 5th Edition, Pearson

b. Recommended Readings

- Meredith, J.R. and Mantel, S.J. (2005) Project Management – a managerial approach, 6th edition, Wiley
- Ghattas, R. G. and Sandra L. Mckee (2001) Practical Project Management, New Jersey, Prentice Hall

c. Magazines andJournals

- Project Manager Today
- PM network
- International Journal of Project and Operation Research, Inderscience

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- Journal of Operation Management, Project and Operation Research, INFORMS

d. Websites

- http://www.providence.edu/mcs/rbg/mba.htm
- http://library.kent.ac.uk/library/exampapers/deptcourses.php?dept=Business%20Studies
- http://homepages.stmartin.edu/fac_staff/dstout/MBA631/lecture_notes.htm

10. Course Organization

Course name		Project Management
Course code		AHM305A
Course Leader/s Name		
Course Leader Contact Details	**Phone:**	080 – 49065555
	E- mail:	
Course Specifications Approval		June 2022
Next Course Specifications Review		June 2026

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BSc. (HONS) Dialysis Therapy Technology (DTT 2022-2026)

SEMESTER 6

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Course Specifications: Extracorporeal therapies other than hemodialysis

Course Title	Extracorporeal therapies other than hemodialysis
Course Code	DTC305A
Department	Allied Health Science
Faculty	Faculty of Life and Allied Health Sciences

I. Course Summary

1. Aim and Summary

The aim of the course is to introduce students of dialysis therapy technology to the advanced extracorporeal renal procedures. This will help them to understand the principals involved in differentadvanced therapeutics procedures.
The students are oriented about the importance of advanced renal therapeutic interventions in the presentscenario.

2. Course Size and Credits:

Number of credits	03
Total hours of classroom interactionduring the semester	30
Number of practical/tutorial hours	60
Number of semester weeks	16
Department responsible	Allied Health Sciences
Course evaluation	Total Marks: 100
Pass requirement	As per the Academic Regulations
Attendance requirement	As per the Academic Regulations

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II. Teaching, Learning and Assessment

1. Course Outcomes (CO)

Upon completion of this course students will be able to:

No.	Intended Learning Outcomes
1.	Explain the principals involved in Continuous renal replacement therapy, Hemoperfusion, Plasmapheresis and Liver dialysis
2.	Explain the anticoagulation protocol for Continuous renal replacement therapy, Hemoperfusion, Plasmapheresis and Liver dialysis
3.	Explain the patient-related and machine-related complications during Continuous renal replacement therapy, Hemoperfusion, Plasmapheresis and Liver dialysis with its management
4.	Demonstrate the Continuous renal replacement therapy, Hemoperfusion
5.	Demonstrate the Plasmapheresis and Liver dialysis procedure.

2. Course Contents:

Course Content
1. Continuous Renal Replacement Therapies (CRRT) • Introduction of CRRT • Read the history of CRRT • List the indications for CRRT and its benefits • Define CRRT and List its modalities • Compare CRRT with Hemodialysis • CRRT apparatus • Explain and identify CRRT apparatus (Machine, Vascular access, extracorporeal circuit, anticoagulant and fluids used) and procedure • Explain the anticoagulation techniques and fluids used for CRRT • CRRT modalities • Explain the CRRT modalities and principals involved (SLED, SCUF, Continuous arteriovenoustherapies & Continuous venovenous therapies) • List the indications and contraindications for each modality of CRRT • Compare the CRRT modalities with each other • List the factors affecting CRRT modalities • List the complications of each modality and explain their prevention and management measures • List the advantages & disadvantages of CRRT modalities

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2. Hemadsorption (Hemoperfusion)

- Principles of Hemadsorption
- Read the history of hemoperfusion
- Define adsorption, molecular weight, surface area, protein binding, the volume of distribution, half-life, molecular redistribution, clearance

- Handling of drug overdose (poisoning) cases
- Explain immediate care
- Explain the basic care at hospital setup
- List the therapies used for poison or drug removal (HD, HP, PD, PP, CRRT)
- Explain the features of drugs/poison and role of extracorporeal therapies used for the treatment(Barbiturates, Paraquat, Alcohol, Digoxin, Acetaminophen, Aspirin)

3. Hemadsorption apparatus

- List the apparatus required for Hemadsorption
- Describe the structure of adsorbent
- Explain the principals involved in drug removal
- Explain the indication and contraindication for hemadsorption
- Explain hemadsoprtion procedure steps
- List the complications and explain their prevention and management
- Compare all blood therapies involved in poison removal
- List the advantages & disadvantages of hemadsorption

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4. Plasmapheresis
- Introduction to Apheresis
- Read the history of plasmapheresis
- Define Apheresis, plasmapheresis, leukapheresis, erythrocytapheresis, thrombocytapheresis, TPE
- Types of Plasmapheresis
- List the indication & contraindications of plasmapheresis
- Explain the principals involved in plasmapheresis
- Explain the methods of plasmapheresis
- Explain the complications & their management of plasmapheresis (MSP & Centrifugation)
- Compare two types of plasmapheresis; Compare MPS with hemodialysis
- Compare replacement fluids used in plasmapheresis
- Compare the anticoagulants used in plasmapheresis
- List and explain the advantages & disadvantages of each type of plasmapheresis

5. Liver Dialysis
- Introduction to Liver dialysis
- List the normal functions of the liver
- List the causes of liver failure
- Define liver dialysis
- List the indications and contraindications for liver dialysis
- Liver Dialysis Techniques
- List the different types of liver dialysis (MARS, SPAD, PROMETHEUS, SEPET)
- Discuss the procedure steps, complication & management of each type
- Compare all types of liver dialysis
- List the advantages & disadvantages of each type
- Compare liver dialysis and kidney dialysis

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3. Course Map (CO-PO-PSO Map)

	Programme Outcomes (POs)												Programme Specific Outcomes (PSOs)			
	PO -1	PO -2	PO -3	PO -4	PO -5	PO -6	PO -7	PO -8	PO -9	PO -10	PO -11	PO -12	PSO -1	PSO -2	PSO -3	PSO -4
CO-1	2			2	2				2				2			2
CO-2	2			1	2				2				2			1
CO-3	2				2				2				2			
CO-4	3				2			1	3			1	3			
CO-5	2				2			1	2			1	2			
3: Very Strong Contribution, 2: Strong Contribution, 1: Moderate Contribution																

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4. Course Teaching and Learning Methods

Teaching and Learning Methods	Duration in hours	Total Duration in Hours
Face-to-Face Lectures		26
Demonstrations		04
15. Demonstration using Videos		
2. Demonstration using Physical Models/ Systems	04	
3. Demonstration on a Computer		
Numeracy		
1. Solving Numerical Problems		
Practical Work		50
1. Course Laboratory	30	
2. Computer Laboratory		
3. Engineering Workshop/Course Workshop/Kitchen		
4. Clinical Laboratory		
5. Hospital	20	
6. Model Studio		
Others		8
1. Case Study Presentation	5	
2. Guest Lecture		
3. Industry/Field Visit		
4. Brain Storming Sessions	3	
5. Group Discussions		
6. Discussing Possible Innovations		
Written Examination (Mid-Term tests and SEE)		02
Total Duration in Hours		90

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5. Method of Assessment

The following is the CE components:

Theory Component CE			Laboratory Component CE	SEE
SC1 (Written Assignment)	SC2 (Assignment)	SC3 (Mid-term test)	SC4 (Formative laboratory performance assessment)	SEE
20 Marks	20 Marks	20 Marks	30 Marks	60 (40 written exam; 20 Viva-voce)

In CE there shall be four subcomponents of CE (SC1, SC2, SC3, and SC4), namely Mid Term; Written Assignment;
Innovative assignments; and Laboratory performance assessment. Each subcomponent is evaluated individually
accounting to 60%Weightage as indicated in Course Specifications. The innovative assignment subcomponents
can be of any of the following types:

a. Online Test
b. Assignments/Problem Solving
c. Field Assignment
d. Open Book Test
e. Portfolio
f. Reports
g. Case Study
h. Group Task
i. Laboratory / Clinical Work Record
j. Computer Simulations
k. Creative Submission
l. Virtual Labs
m. Viva / Oral Exam
n. Lab Manual Report
o. Any other

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After the four subcomponents are evaluated, the CE component marks are consolidated to attain 60% Weightage. Laboratory/Practical shall be shifted as part of CE. The lab component as part of CE will have external examiner evaluation and marks listed separately for industry requirements. For a theory + laboratory course, the Semester End Examination shall be a 2-hour theory paper of 50 marks with a weightage of 40% and there will be a 20 marks Viva- Voce. In summary, the ratio of Formative (Continuous Evaluation-CE) Vs Summative (Semester End Examination-SEE)should be 60:40.

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6. Achieving learning outcomes

The following skills are directly or indirectly imparted to the students in the following teaching and learning methods:

S.No	Curriculum and Capabilities	How imparted during the course
1.	Knowledge	Class room lectures
2.	Understanding	Class room lectures
3.	Critical Skills	Case study and group discussions
4.	Analytical Skills	Group discussion
5.	Problem Solving Skills	Case discussions
6.	Practical Skills	Case discussions
7.	Group Work	Case study and group discussions
8.	Self-Learning	Seminars
9.	Written Communication Skills	Examination
10.	Verbal Communication Skills	Group discussions
11.	Presentation Skills	Case discussions, Seminars
12.	Behavioral Skills	Group discussion, Case discussions
13.	Information Management	Case discussions
14.	Leadership Skills	Group discussions

III. Course Resources

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a. Essential Reading

- Course notes
- Allen R. Nissenson,Richard N. Fine Dialysis Therapy 3 edition (2001) Hanley &Belfus
- R. Gokal, Ramesh Khanna, Raymond T. Krediet , K.D. Nolph ,Textbook of PeritonealDialysis(2000) Springer2nd ed. edition
- John T. Daugirdas , Peter G. Blake , Todd S. Ing , Handbook of Dialysis, 5th edition (2014),Lippincott Williams and Wilkins;
- NANT and Oxford -Text books of Dialysis for technologists

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b. Recommended Reading

- Allen Nissenson Richard Fine, Handbook of Dialysis Therapy, 5th Edition(2016) Elsevier.
- William L. Henrich, Principles and Practice of Dialysis (Principles & Practice of Dialysis), 4th edition (2009) Lippincott Williams and Wilkins

c. Magazines and Journals

- Journal of Renal disorders and management

d. Websites

- www.renal.org.
- Videos in the library

IV. Course Organization

Course Code		DTC305A
Course Title		Extracorporeal therapies other than hemodialysis
Course Leader/s Name		
Course Leader Contact Details	**Phone:**	080 – 49065555
	E- mail:	
Course Specifications Approval		
Next Course Specifications Review		

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Course Specifications: Pediatric Dialysis and Transplantation

Course Title	Pediatric Dialysis and Transplantation
Course Code	DTC306A
Department	Allied Health Science
Faculty	Faculty of Life and Allied Health Sciences

I. Course Summary

a. Aim and Summary

The aim of the course is to introduce students of dialysis technology to the basis investigations in renal diseases. This should help them to understand the investigations done in various renal disease conditionsin pediatric. This course provides the necessary knowledge on pediatric dialysis and kidney transplantation -related aspects applied to dialysis technology and dialysis field. It provides the basic knowledge of pre post and during transplantation.

b. Course Size and Credits:

Number of credits	03
Total hours of class room interaction during the semester	30
Number of practical/tutorial hours	60
Number of semester weeks	16
Department responsible	Allied Health Sciences
Course evaluation	Total Marks: 100
Pass requirement	As per the Academic Regulations
Attendance requirement	As per the Academic Regulations

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II. Teaching, Learning and Assessment

a. Course Outcomes (CO)

Upon completion of this course students will be able to:

No.	Intended Learning Outcomes
1.	Explain the hematological, biochemical and microbiological tests used in renal failure patients
2.	Explain the basic principles of blood cross matching and immunologic test related to renal disease
3.	Explain maintenance hemodialysis for pediatric patients
4.	Explain the basics radiological investigations related to pediatric patients
5.	Explain the importance technical aspects and major complication in dialysis

b. Course Contents:

Course Content
1. Pediatric Dialysis • History of dialysis therapy in childrenHemodialysis • Hemodialysis vascular access in children • Haemodiafltration: Principles, Technique, and Advantages over ConventionalHaemodialysis • Maintenance Hemodialysis During Infancy • Home Haemodialysis in Children • Infectious Complications of Hemodialysis in Children • Non-infectious Complications of Hemodialysis in ChildrenPeritoneal Dialysis • Peritoneal Access in Children Receiving Dialysis • Technical Aspects and Prescription of Peritoneal Dialysis in Children • Peritoneal Dialysis Solutions • Peritoneal Dialysis During Infancy • Infectious Complications of Peritoneal Dialysis in Children • Noninfectious Complications of Peritoneal Dialysis in ChildrenManagement of complications of chronic dilaysis • Nutritional Assessment and Prescription for Children Receiving Maintenance Dialysis • The Management of CKD-MBD in Pediatric Dialysis Patient • The Cardiovascular Status of Pediatric Dialysis Patients • Management of Hypertension in Pediatric Dialysis Patients • Management of Anemia in Children Receiving Chronic Dialysis • Immune Function and Immunizations in Dialyzed ChildrenDrugs & Dialysis

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- Role of Radiological Assessment and Intervention in Pediatric Dialysis
- Extracorporeal Therapy for Drug Overdose and Poisoning

Special Indications ,techniques and applications

- Diagnosis and Treatment of Acute Kidney Injury in Children and Adolescents
- Neonatal Acute Kidney Injury
- Extracorporeal Liver Support Therapies for Children
- Therapeutic Apheresis in Children
- Evaluating and Preparing the Pediatric Dialysis Patient for Kidney Transplantation

Kidney Transplantation

- Evaluation of the living donor and recipients
- Transplantation immunobiology
- Surgical management of the renal transplant recipient
- biological agents in kidney transplantation
- immunosuppressant's
- infection in renal transplantation
- pediatric transplantation

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c. Course Map (CO-PO-PSO Map)

	Programme Outcomes (POs)												Programme Specific Outcomes (PSOs)			
	PO -1	PO -2	PO -3	PO -4	PO -5	PO -6	PO -7	PO -8	PO -9	PO -10	PO -11	PO -12	PSO -1	PSO -2	PSO -3	PSO -4
CO-1	2			2	2				2				2			2
CO-2	2			1	2				2				2			1
CO-3	2				2				2				2			
CO-4	3				2			1	3			1	3			
CO-5	2				2			1	2			1	2			

3: Very Strong Contribution, 2: Strong Contribution, 1: Moderate Contribution

d. Course Teaching and Learning Methods

Teaching and Learning Methods	Duration in hours	Total Duration in Hours
Face-to-Face Lectures		20
Demonstrations		05
16. Demonstration using Videos		
2. Demonstration using Physical Models/ Systems	05	
3. Demonstration on a Computer		
Numeracy		
1. Solving Numerical Problems		
Practical Work		

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1. Course Laboratory		
2. Computer Laboratory		
3. Engineering Workshop/Course Workshop/Kitchen		
4. Clinical Laboratory		
5. Hospital		
6. Model Studio		
Others		
1. Case Study Presentation		
2. Guest Lecture		
3. Industry/Field Visit		
4. Brain Storming Sessions		
5. Group Discussions		
6. Discussing Possible Innovations		
Written Examination (Mid-Term tests and SEE)		05
Total Duration in Hours		30

e. Method of Assessment

The following is the CE components:

Theory Component CE			**Laboratory Component CE**	**SEE**
SC1 (Written Assignment)	SC2 (Assignment)	SC3 (Mid-term test)	SC4 (Formative laboratory performance assessment)	SEE
20 Marks	20 Marks	20 Marks	30 Marks	60 (40 written exam; 20 Viva-voce)

In CE there shall be three subcomponents of CE (SC1, SC2, and SC3), namely Mid Term; Written Assignment; Innovative assignments. Each subcomponent is evaluated individually accounting to 60% Weightage as indicated

in Course Specifications. The innovative assignment subcomponents can be of any of the following types:

a. Online Test
b. Assignments/Problem Solving
c. Field Assignment
d. Open Book Test
e. Portfolio
f. Reports
g. Case Study
h. Group Task
i. Laboratory / Clinical Work Record
j. Computer Simulations
k. Creative Submission
l. Virtual Labs
m. Viva / Oral Exam

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n. Lab Manual Repor

After the three subcomponents are evaluated, the CE component marks are consolidated to attain 60% Weightage. The Semester End Examination shall be a 2-hour theory paper of 50 marks with a weightage of 40% in case of theory courses. In summary, the ratio of Formative (Continuous Evaluation-CE) Vs Summative
(Semester End Examination-SEE) should be 60:40.

f. Achieving learning outcomes

The following skills are directly or indirectly imparted to the students in the following teaching and learning methods:

S.No	Curriculum and Capabilities	How imparted during the course
1.	Knowledge	Class room lectures
2.	Understanding	Class room lectures
3.	Critical Skills	Class room lectures
4.	Analytical Skills	Group discussion
5.	Problem Solving Skills	Case discussions
6.	Practical Skills	Case discussions
7.	Group Work	case study and group discussions
8.	Self-Learning	Seminars
9.	Written Communication Skills	Examination
10.	Verbal Communication Skills	Group discussions
11.	Presentation Skills	Seminars, Case discussions
12.	Behavioral Skills	Group discussion, Case discussions
13.	Information Management	Case discussions
14.	Leadership Skills	Group discussions

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III. Course Resources

a. Essential Reading

- Course notes
- Allen R. Nissenson,Richard N. Fine Dialysis Therapy 3 edition (2001) Hanley &Belfus
- R. Gokal, Ramesh Khanna, Raymond T. Krediet , K.D. Nolph ,Textbook of PeritonealDialysis(2000) Springer2nd ed. edition
- John T. Daugirdas , Peter G. Blake , Todd S. Ing , Handbook of Dialysis, 5th edition (2014),Lippincott Williams and Wilkins;
- NANT and Oxford -Text books of Dialysis for technologists

b. Recommended Reading

- Allen Nissenson Richard Fine, Handbook of Dialysis Therapy, 5th Edition(2016) Elsevier.
- William L. Henrich, Principles and Practice of Dialysis (Principles & Practice of Dialysis), 4thedition (2009) Lippincott Williams and Wilkins

c. Magazines and Journals

- Journal of Renal disorders and management

d. Websites

- www.renal.org.
- Videos in the library

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IV. Course Organization

Course Code		DTC306A
Course Title		Pediatric Dialysis and Transplantation
Course Leader/s Name		
Course Leader Contact Details	**Phone:**	080 – 49065555
	E- mail:	
Course Specifications Approval		
Next Course Specifications Review		

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Course Specifications: Directed clinical education – V

Course Title	Directed clinical education – V
Course Code	DTC308A
Department	Allied Health Science
Faculty	Faculty of Life and Allied Health Sciences

I. Course Summary

a. Aim and Summary

The course aims to impart basic knowledge and additional skills in clinical procedures, interaction with patients and professional personnel. Students apply knowledge from previous clinical learning experience under the supervision of a nephrologist or senior Dialysis Therapy Technologist. Students aretested on intermediate clinical dialysis therapy technology skills including hemodialysis and peritoneal and peritoneal dialysis Therapy. The student will perform these procedures with more responsibility and with minimal supervision.

b. Course Size and Credits:

Number of credits	12
Total hours of class room interaction during the semester	
Number of practical/tutorial hours	360
Number of semester weeks	16
Department responsible	Allied Health Sciences
Course evaluation	Total Marks: 100
Pass requirement	As per the Academic Regulations
Attendance requirement	As per the Academic Regulations

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II. Teaching, Learning and Assessment

a. Course Outcomes (CO)

Upon completion of this course students will be able to:

No.	Intended Learning Outcomes
1.	Demonstrate the competencies acquired for patient preparation, equipment handing and operation
2.	Perform the ability to start hemodialysis, peritoneal dialysis in different patient population including pediatric population
3.	Demonstrate A-V cannulation
4.	Operate hemodialysis machines, CAPD cyclers reuse machines independently
5.	Start and terminate hemodialysis sessions independently
6	Perform the preparation for CRRT, hemoperfusion and plasmapherasis

b. Course Contents:

Course Content :

To achieve final competency substantial time will be spent :

Setting up multi field techniques under supervision.

Participating in the quality control procedures in the department in accordance with the protocols.

Simulating and localizing a target volume.

Discussing the role of local rules and outline those in place in the different departments

Hemodialysis and peritoneal dialysis;

- Initiating hemodialysis through central lines
- Performing PD exchanges manually/cycler device
- Dialysis therapy in various special groups of patients e.g., unstable patients in Theintensive care unit, children, cardiac patients etc.;
- Plasmapheresis and Continuous therapies
- Measure the adequacy of dialysis
- Administer various drugs in emergencies and as a routine
- Perform blood transfusion during procedure
- Start and terminate hemodialysis sessions independently
- Successfully cannulate arterio-venous fistulae for hemodialysis
- Train patients and their caregivers in performing peritoneal dialysis
- Do water maintenance for the hemodialysis
- Maintain hemodialysis machines with respect to regular disinfection
- Operate hemodialysis machines, CAPD cylers reuse machines independently
- Participate in Conduct of renal transplant programme

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- Use pulse oximeters, pressure monitors defibrillators correctlyCPR demonstration
- Assisting minor procedures like central line insertions, renal biopsies, PD catheterinsertion
- , basics in transplant immunology, donor selection,recipient evaluation
- Problems encountered in transplant recipient- rejection, infection, drug toxicity,dyslipidemias, diabetes, cosmetic changes, impaired graft function.
- Monitoring of patient on the waiting list for transplant.
- Watching transplant inside the operation theatre
- Demonstrate the patient assessment, identify the clinical features of medical tests
- modification in the HD prescription
- possible complications during dialysis; their prevention, and management
    - Handling the dialysis procedure
- Independent hemodialysis procedure handling
- Record maintenance and documentation
- Continuous Renal Replacement Therapies (CRRT)
- Hemadsorption (Hemoperfusion)
- Plasmapheresis
- Peritoneal Dialysis
- Sustained low-efficiency dialysis (SLED)
- Slow continuous ultrafiltration and isolated ultra-filtration (SCUF & IUF)
- BCLS and Crash-cart management
- Single blood pathway ("single-needle") devices

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c. Course Map (CO-PO-PSO Map)

	Programme Outcomes (POs)												Programme Specific Outcomes (PSOs)			
	PO -1	PO -2	PO -3	PO -4	PO -5	PO -6	PO -7	PO -8	PO -9	PO -10	PO -11	PO -12	PSO -1	PSO -2	PSO -3	PSO -4
CO-1	3							2					2			3
CO-2	3							2					2			3
CO-3	3							2					2			3
CO-4	3							2					2	1		3
CO-5	3							2					3			3
CO-6	3	1					1	2					2			3
3: Very Strong Contribution, 2: Strong Contribution, 1: Moderate Contribution																

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4. Course Teaching and Learning Methods

Teaching and Learning Methods	Duration in hours	Total Duration in Hours
Face-to-Face Lectures		
Demonstrations		10
17. Demonstration using Videos		
2. Demonstration using Physical Models/ Systems	10	
3. Demonstration on a Computer		
Numeracy		
1. Solving Numerical Problems		
Practical Work		270
1. Course Laboratory		
2. Computer Laboratory		
3. Engineering Workshop/Course Workshop/Kitchen		
4. Clinical Laboratory	100	
5. Hospital	170	
6. Model Studio		
Others		10
1. Case Study Presentation	5	
2. Guest Lecture		
3. Industry/Field Visit		
4. Brain Storming Sessions	5	
5. Group Discussions		
6. Discussing Possible Innovations		
Written Examination (Mid-Term tests and SEE)		10
Total Duration in Hours		300

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5. Method of Assessment

The following is the CE components:

Theory Component CE	
SC1 (Log book)	SC2 (Viva Voce)
50 Marks	50 Marks

In CE there shall be two subcomponents of CE (SC1, SC2,), namely log book and viva-voce assessment. Each subcomponent is evaluated individually accounting to 100% Weightage as indicated in Course Specifications

6. Achieving learning outcomes

The following skills are directly or indirectly imparted to the students in the following teaching and learning methods:

S.No	Curriculum and Capabilities	How imparted during the course
1.	Knowledge	Class room lectures
2.	Understanding	Class room lectures
3.	Critical Skills	Class room lectures
4.	Analytical Skills	Group discussion
5.	Problem Solving Skills	Case discussions
6.	Practical Skills	Case discussions
7.	Group Work	case study and group discussions
8.	Self-Learning	Seminars
9.	Written Communication Skills	Examination
10.	Verbal Communication Skills	Group discussions
11.	Presentation Skills	Seminars, Case discussions
12.	Behavioral Skills	Group discussion, Case discussions
13.	Information Management	Case discussions
14.	Leadership Skills	Group discussions

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III. Course Resources

a. Essential Reading

- Course notes
- Allen R. Nissenson,Richard N. Fine Dialysis Therapy 3 edition (2001) Hanley &Belfus
- R. Gokal, Ramesh Khanna, Raymond T. Krediet , K.D. Nolph ,Textbook of PeritonealDialysis(2000) Springer2nd ed. edition
- John T. Daugirdas , Peter G. Blake , Todd S. Ing , Handbook of Dialysis, 5th edition (2014),Lippincott Williams and Wilkins;
- NANT and Oxford -Text books of Dialysis for technologists

b. Recommended Reading

- Allen Nissenson Richard Fine, Handbook of Dialysis Therapy, 5th Edition(2016) Elsevier.
- William L. Henrich, Principles and Practice of Dialysis (Principles & Practice of Dialysis), 4thedition (2009) Lippincott Williams and Wilkins

c. Magazines and Journals

- Journal of Renal disorders and management

D. Websites

- www.renal.org.
- Videos in the library

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IV. Course Organization

Course Code		DTC308A
Course Title		Directed Clinical Education V
Course Leader/s Name		
Course Leader Contact Details	**Phone:**	080 – 49065555
	E- mail:	
Course Specifications Approval		
Next Course Specifications Review		
Course Specifications Review		

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Course Specifications: Research Project

Course Title	Research Project
Course Code	DTP401A
Department	Allied Health Sciences
Faculty	Faculty of Life and Allied Health Sciences

1. Course Summary

1. Aim and Summary

The aim of this course is to give students an experience of addressing a real time problem in Optometry. The students are expected to work in a team of not more than 4 members and are required to develop an appropriate solution by identifying a problem for which a better or new solution is required. The team need to propose a solution / develop a physical product and write a project report.

2. Course Size and Credits:

Number of credits	10
Total hours of class room interaction during the semester	290
Number of practical hours	00
Number of semester weeks	29
Department responsible	Allied Health Sciences
Course evaluation	Total Marks: 100 The distribution of marks for theory and laboratory/clinical component for continuous and Semester end examination is as per the Programme specification
Pass requirement	As per the Academic Regulations
Attendance requirement	As per the Academic Regulations

Teaching, Learning and Assessment

3. Course Outcomes (CO)

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Upon completion of this course students will be able to:

No.	Course outcome
1.	**CO1:** Refine the problem in Allied Health Science
2.	**CO2:** Identify appropriate methodology to solve the problem
3.	**CO3:** Propose solutions to the problem identified
4.	**CO4:** Prepare a project report as per the specified guidelines
5.	**CO5:** Presentation of the research finding in an appropriate forum

4. Course Contents:

- Identifying a problem for which a better or new solution is required, through literature review
- To learn PICO search and evidence
- Defining the scope of the problem followed by aim and objectives
- Identifying the methodology to meet the objectives
- Data collection, analysis and interpretation
- Preparing/ writing a project report and presentation in appropriate forum

5. Course Map (CO-PO-PSO Map)

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	Programme Outcomes (POs)												Programme Specific Outcomes (PSOs)			
	PO -1	PO -2	PO -3	PO -4	PO -5	PO -6	PO -7	PO -8					PSO-1	PSO -2	PSO -3	PSO-4
CO -1	2							2					1			
CO -2	2	2											2			
CO -3	2							2								2
CO -4	2						2						2		2	
CO -5		3				2	2								2	2
3: Very Strong Contribution, 2: Strong Contribution, 1: Moderate Contribution																

6. Course Teaching and Learning Methods

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Teaching and Learning Methods		Duration in hours
1.	Refining Problem, Aim, Objective & Methodology in concurrence with academic guide	50
2.	Review Plan, design and execution of experiments	50
3.	Data collection, Analysis and Interpretation	150
4.	Discussion with supervisor	10
5.	Propose Solution	20
6.	Report Presentation	10
Total Duration Hours		60

1. Method of Assessment

Laboratory Component CE	SEE
SC1 (Protocol presentation, Data collection, Analysis)	SEE
60 Marks	40 (Thesis Presentation)

In CE there shall be three subcomponents of CE (SC1, SC2, and SC3), namely Mid Term; Written Assignment; Innovative assignments. Each subcomponent is evaluated individually accounting to 60% Weightage as indicated in Course Specifications. The innovative assignment subcomponents can be of any of the following types:

- Online Test
- Assignments/Problem Solving
- Field Assignment
- Open Book Test
- Portfolio
- Reports
- Case Study
- Group Task
- Laboratory / Clinical Work Record
- Computer Simulations
- Creative Submission
- Virtual Labs
- Viva / Oral Exam
- Lab Manual Report
- Any other

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After the three subcomponents are evaluated, the CE component marks are consolidated to attain 60% Weightage. The Semester End Examination shall be a 2-hour theory paper of 50 marks with a weightage

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of 40% in case of theory courses. In summary, the ratio of Formative (Continuous Evaluation-CE) Vs Summative (Semester End Examination-SEE) should be 60:40.

8. Achieving learning outcomes

The following skills are directly or indirectly imparted to the students in the following teaching and learning methods:

SL.no	Curriculum and Capabilities Skills	How imparted during the course
1.	Knowledge	Class room lectures
2.	Understanding	Class room lectures
3.	Critical Skills	Class room lectures
4.	Analytical Skills	Group discussion
5.	Problem Solving Skills	Case discussions
6.	Practical Skills	Case discussions
7.	Group Work	case study and group discussions
8.	Self-Learning	Seminars
9.	Written Communication Skills	Examination
10.	Verbal Communication Skills	Group discussions
11.	Presentation Skills	Seminars, Case discussions
12.	Behavioral Skills	Group discussion, Case discussions
13.	Information Management	Case discussions
14.	Leadership Skills	Group discussions

9. Course Resources

1. Essential Reading

- Gurumani, N., 2006, Research methodology for biological sciences, MJP Publishers
- Gurumani, N., 2010, *Scientific Thesis Writing And Paper Presentation*, 1st Edition, MJP Publishers.
- https://www.ncbi.nlm.nih.gov/pubmed
- https://www.sciencedirect.com/
- https://www.biomedcentral.com/
- http://www.nature.com/
- https://www.cell.com/
- Journals related to the respective topics of research

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10. Course Organization

Course name		Research Project
Course code		DTP401A
Course Leader/s Name		
Course Leader Contact Details	**Phone:**	080 – 49065555
	E- mail:	
Course Specifications Approval		June 2022
Next Course Specifications Review		June 2026

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Course Specifications: **Internship**

Course Title	Internship
Course Code	DTI401A
Department	Allied Health Science
Faculty	Faculty of Life and Allied Health Sciences

I. Course Summary

1. Aim and Summary

This internship training deals with postings in various specialty units of the Nephrology. [dialysis unit]. The students are trained to acquire skills for the actual conduct of all the clinical services entrusted to them in those specialty units leading to the emergence of fully trained dialysis therapy technologist.

2. Course Size and Credits:

Number of credits	10
Total hours of class room interaction during the semester	880
Number of practical/tutorial hours	
Number of semester weeks	16
Department responsible	Allied Health Sciences
Course evaluation	Total Marks: 100
Pass requirement	As per the Academic Regulations
Attendance requirement	As per the Academic Regulations

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II. Teaching, Learning and Assessment

1. Course Outcomes (CO)

Upon completion of this course students will be able to:

No.	Intended Learning Outcomes
1.	Initiate, monitor and close of hemodialysis procedure independently.
2.	Identify and manage complications during hemodialysis and
3.	peritoneal dialysis
4.	Able to do plasmapheresis
5.	Starting termination of the hemodialysis procedure in various types of

2. Course Contents:

Content
Main tasks- A. Assess the patient's chart and vitals B. Manage dialysis machine set up and assemble the extracorporeal circuit C. Prepare and position the patient for treatment D. Connect patient to the dialysis machine E. Monitor technical/ clinical vitals during the treatment F. Unhook patient from the machine G. Record the treatment H. Conduct pre and post dialysis evaluation I. Maintain and disinfect the delivery system J. Evaluate and prepare the site for cannulation
Details 1. To take patients vitals like pulse, BP, weight, respiratory rate 2. Read and understand the patients' reports 3. Understand the mechanics and functioning of all parts of the dialysis machine 4. Calibrate the machine 5. Sterilization of dialysis machine 6. To assemble and check the extracorporeal circuit parts i.e. the patient connectors,Dialyzer connectors, Drip chamber and bubble trap, Blood pump segment, Heparin infusion line, and saline infusion line 7. Positioning and draping of patient

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Approved by the Academic Council at its 25th meeting held on 14 July 2022

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3. Course Map (CO-PO-PSO Map)

	Programme Outcomes (POs)												Programme Specific Outcomes (PSOs)			
	PO -1	PO -2	PO -3	PO -4	PO -5	PO -6	PO -7	PO -8	PO -9	PO -10	PO -11	PO -12	PSO -1	PSO -2	PSO -3	PSO -4
CO-1	3							2					2			3
CO-2	3							2					2			3
CO-3	3							2					2	1		3
CO-5	3							2					2			3
CO-5	3							2					2			3
3: Very Strong Contribution, 2: Strong Contribution, 1: Moderate Contribution																

4. Course Teaching and Learning Methods

Teaching and Learning Methods	Duration in hours	Total Duration in Hours
Face to Face Lectures		
Demonstrations		
1. Demonstration using Videos		
2. Demonstration using Physical Models/ Systems		
3. Demonstration on a Computer		
Numeracy		
1. Solving Numerical Problems		
Practical Work		
1. Course Laboratory		
2. Computer Laboratory		
3. Engineering Workshop/Course Workshop/Kitchen		
4. Clinical Laboratory		
5. Hospital		
6. Model Studio		
Others		
1. Case Study Presentation		
2. Guest Lecture		
3. Industry/Field Visit		
4. Brain Storming Sessions		
5. Group Discussions		
6. Discussing Possible Innovations		

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Written Examination (Mid-Term tests and SEE)	
Total Duration in Hours	

5. Method of Assessment

The following is the CE components:

Laboratory Component CE	SEE
SC1 (Log book & Formative Laboratory performance assessment)	SEE
60 Marks	60 Marks

6. Achieving learning outcomes

The following skills are directly or indirectly imparted to the students in the following teaching and learning methods:

S.No	Curriculum and Capabilities	How imparted during the course
1.	Knowledge	Clinical postings
2.	Understanding	Clinical postings
3.	Critical Skills	Clinical postings
4.	Analytical Skills	Clinical postings
5.	Problem Solving Skills	Clinical postings
6.	Practical Skills	Clinical postings
7.	Group Work	Clinical postings
8.	Self-Learning	Clinical postings
9.	Written Communication Skills	Clinical postings
10.	Verbal Communication Skills	Clinical postings
11.	Presentation Skills	Clinical postings
12.	Behavioral Skills	Clinical postings
13.	Information Management	Clinical postings
15.	Leadership Skills	Clinical postings

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III. Course Resources

1. Essential Reading
   - World Health Organization (2016). Global Report on Diabetes. WHO Press, Switzerland
   - Course notes
   - Allen R. Nissenson,Richard N. Fine Dialysis Therapy 3 edition (2001) Hanley &Belfus
   - R. Gokal, Ramesh Khanna, Raymond T. Krediet , K.D. Nolph ,Textbook of Peritoneal Dialysis(2000) Springer2nd ed. edition
   - John T. Daugirdas , Peter G. Blake , Todd S. Ing , Handbook of Dialysis, 5th edition (2014), Lippincott Williams and Wilkins;
   - NANT and Oxford -Text books of Dialysis for technologists
2. Recommended Reading
   - Nutrition Allen Nissenson Richard Fine, Handbook of Dialysis Therapy, 5th Edition(2016) Elsevier.
   - William L. Henrich, Principles and Practice of Dialysis (Principles & Practice of Dialysis), 4th edition (2009) Lippincott Williams and Wilkins
3. Magazines and Journals
   - Journal of Renal disorders and management
4. Websites
   - www.renal.org.
   - Videos in the library
   - http://bmj.com

IV. Course Organization

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Course		Internship
Course		DTI401A
Course Leader/s Name		
Course Leader Contact Details	**Phone:**	080 – 49065555
	E- mail:	
Course Specifications Approval		
Next Course Specifications Review		

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Bangalore - 560 054

Course Specifications: Research Project

Course Title	Research Project
Course Code	DTP402A
Department	Allied Health Sciences
Faculty	Faculty of Life and Allied Health Sciences

1. Course Summary

1. Aim and Summary

The aim of this course is to give students an experience of addressing a real time problem in Optometry. The students are expected to work in a team of not more than 4 members and are required to develop an appropriate solution by identifying a problem for which a better or new solution is required. The team need to propose a solution / develop a physical product and write a project report.

2. Course Size and Credits:

Number of credits	10
Total hours of class room interaction during the semester	290
Number of practical hours	00
Number of semester weeks	29
Department responsible	Allied Health Sciences
Course evaluation	Total Marks: 100 The distribution of marks for theory and laboratory/clinical component for continuous and Semester end examination is as per the Programme specification
Pass requirement	As per the Academic Regulations
Attendance requirement	As per the Academic Regulations

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Teaching, Learning and Assessment

3. Course Outcomes (CO)

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Approved by the Academic Council at its 26th meeting held on 14 July 2022

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Upon completion of this course students will be able to:

No.	Course outcome
1.	**CO1:** Refine the problem in Allied Health Science
2.	**CO2:** Identify appropriate methodology to solve the problem
3.	**CO3:** Propose solutions to the problem identified
4.	**CO4:** Prepare a project report as per the specified guidelines
5.	**CO5:** Presentation of the research finding in an appropriate forum

4. Course Contents:

- Identifying a problem for which a better or new solution is required, through literature review
- To learn PICO search and evidence
- Defining the scope of the problem followed by aim and objectives
- Identifying the methodology to meet the objectives
- Data collection, analysis and interpretation
- Preparing/ writing a project report and presentation in appropriate forum

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5. Course Map (CO-PO-PSO Map)

	Programme Outcomes (POs)												Programme Specific Outcomes (PSOs)			
	PO -1	PO -2	PO -3	PO -4	PO -5	PO -6	PO -7	PO -8					PSO-1	PSO -2	PSO -3	PSO-4
CO -1	2							2					1			
CO -2	2	2											2			
CO -3	2							2								2
CO -4	2						2						2		2	
CO -5		3				2	2								2	2
3: Very Strong Contribution, 2: Strong Contribution, 1: Moderate Contribution																

6. Course Teaching and Learning Methods

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Teaching and Learning Methods		Duration in hours
1.	Refining Problem, Aim, Objective & Methodology in concurrence with academic guide	50
2.	Review Plan, design and execution of experiments	50
3.	Data collection, Analysis and Interpretation	150
4.	Discussion with supervisor	10
5.	Propose Solution	20
6.	Report Presentation	10
Total Duration Hours		60

2. Method of Assessment

Laboratory Component CE	SEE
SC1 (Protocol presentation, Data collection, Analysis)	SEE
60 Marks	40 (Thesis Presentation)

In CE there shall be three subcomponents of CE (SC1, SC2, and SC3), namely Mid Term; Written Assignment; Innovative assignments. Each subcomponent is evaluated individually accounting to 60% Weightage as indicated in Course Specifications. The innovative assignment subcomponents can be of any of the following types:

- Online Test
- Assignments/Problem Solving
- Field Assignment
- Open Book Test
- Portfolio
- Reports
- Case Study
- Group Task
- Laboratory / Clinical Work Record
- Computer Simulations
- Creative Submission
- Virtual Labs
- Viva / Oral Exam
- Lab Manual Report
- Any other

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After the three subcomponents are evaluated, the CE component marks are consolidated to attain 60% Weightage. The Semester End Examination shall be a 2-hour theory paper of 50 marks with a weightage

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of 40% in case of theory courses. In summary, the ratio of Formative (Continuous Evaluation-CE) Vs Summative (Semester End Examination-SEE) should be 60:40.

8. Achieving learning outcomes

The following skills are directly or indirectly imparted to the students in the following teaching and learning methods:

SL.no	Curriculum and Capabilities Skills	How imparted during the course
1.	Knowledge	Class room lectures
2.	Understanding	Class room lectures
3.	Critical Skills	Class room lectures
4.	Analytical Skills	Group discussion
5.	Problem Solving Skills	Case discussions
6.	Practical Skills	Case discussions
7.	Group Work	case study and group discussions
8.	Self-Learning	Seminars
9.	Written Communication Skills	Examination
10.	Verbal Communication Skills	Group discussions
11.	Presentation Skills	Seminars, Case discussions
12.	Behavioral Skills	Group discussion, Case discussions
13.	Information Management	Case discussions
14.	Leadership Skills	Group discussions

9. Course Resources

1. Essential Reading

- Gurumani, N., 2006, Research methodology for biological sciences, MJP Publishers
- Gurumani, N., 2010, *Scientific Thesis Writing And Paper Presentation*, 1st Edition, MJP Publishers.
- https://www.ncbi.nlm.nih.gov/pubmed
- https://www.sciencedirect.com/
- https://www.biomedcentral.com/
- http://www.nature.com/
- https://www.cell.com/
- Journals related to the respective topics of research

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10. Course Organization

Course name		Research Project
Course code		DTP402A
Course Leader/s Name		
Course Leader Contact Details	**Phone:**	080 – 49065555
	E- mail:	
Course Specifications Approval		June 2022
Next Course Specifications Review		June 2026

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Course Specifications: **Internship**

Course Title	Internship
Course Code	DTI402A
Department	Allied Health Sciences
Faculty	Faculty of Life and Allied Health Sciences

I. Course Summary

1. Aim and Summary

This course aims to give a background of scientific research principles, and emphasizes on the methodologies that are used to conduct research specifically in the field of public health. The students will be introduced to important components of research paradigm (ontology, epistemology, methodology and ethics), principles, process and approaches to research methodologies relevant to public health research. They will be also trained to conduct systematic and rigorous literature review and use appropriate methods (quantitative, qualitative and mixed-method), tools, techniques and technologies to conduct research in public health.

2. Course Size and Credits:

Number of credits	10
Total hours of class room interaction during the semester	880
Number of practical/tutorial hours	
Number of semester weeks	16
Department responsible	Allied Health Sciences
Course evaluation	Total Marks: 100
Pass requirement	As per the Academic Regulations
Attendance requirement	As per the Academic Regulations

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II. Teaching, Learning and Assessment

3. Course Outcomes (CO)

Upon completion of this course students will be able to:

No.	Intended Learning Outcome
1	Perform special hemodialysis techniques like SLED, CRRT, perform CAPD exchange and train the patient / relative for CAPD exchange procedure
2	Perform dialysis machine maintenance, sterilization procedure of dialysis unit
3	Prepare dialyzer reuse technique, maintain RO plant
4	Counsel dialysis patients regarding transplantation and able to monitoring transplant patient in immediate post-transplant period
5	Identify and manage complications during hemodialysis and peritoneal dialysis.

4. Course Contents

Content
Main tasks- Respond to dialysis related emergencies in patient and equipment Reprocess dialysers Operate and maintain water treatment plant Follow infection control policies and procedures Work effectively with others Maintain a safe, healthy, and secure working environment Biomedical waste disposal Monitor and assure quality
• Follow protocol for dialysis initiation. • Monitor various indicators, alarms and sensors of the dialysis machine. To take corrective measures for the same. • To inform in case of medical emergency to the concerned person.Detach all connections between patient and unit • Carefully remove IV cannulas with minimum discomfort to patient Suitably dress the canula/ catheter to keep it sterile and comfortable • Document dialysis on the patient's chart in the right format

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1. Noticing any change or distress in the patient during or after dialysis
2. Communicate effectively with patient, doctors and nurses to enable quickremedial action
3. To replace dialysate, dialyzer or other constituents as per need
4. Follow standard sterilisation and cleaning procedure for the unit
5. See how catheters are placed and assist in the various methods of catheterplacement
6. Clean up any spillage
7. Operate and maintain water treatment plant
8. Record all checks, including time and initials, on the Daily Dialysis Water Equipment Monitoring Log Sheet
9. Preform the standard precautions to prevent the spread of infection in accordance with organisation requirements
10. Document and report activities and tasks that put patients and/or other workersat risk
11. Maintain hand hygiene before and after patient contact and/or after any activitylikely to cause contamination
12. Clean all work surfaces
13. Decontaminate equipment

Main tasks for peritoneal dialysis:

C. Able to train the patient / relative for CAPD exchange procedure
D. Able to identify peritonitis / exit site infection
E. Able to perform PET test

Details:

6. Explain the steps of access, performing the exchanges and maintenance ofcatheter to the patient and attenders
7. Explain to the patient and attenders the features of peritonitis
8. Collect PD fluid for analysis
9. Perform PET test
10. Understand the main features of PET test results
11. Catheter exit site care
12. Instill IP antibiotics

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Main tasks regarding renal transplantation:

A. Able to counsel dialysis patients regarding transplantation
B. Be well versed with HOTA
C. Be aware of monitoring transplant patient in immediate post-transplant period

Details:

1. Understand the advantages of renal transplantation and explain the same to the patient and attenders

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5. Course Map (CO-PO-PSO Map) RM

	Programme Outcomes (POs)												Programme Specific Outcomes (PSOs)			
	PO-1	PO-2	PO-3	PO-4	PO-5	PO-6	PO-7	PO-8	PO-9	PO-10	PO-11	PO-12	PSO-1	PSO-2	PSO-3	PSO-4
CO-1	3							2					2			3
CO-2	3							2					2			3
CO-3	3							2					2			3
CO-4	3							2					2	1		3
CO-5	3							2					2			3
3: Very Strong Contribution, 2: Strong Contribution, 1: Moderate Contribution																

6. Course Teaching and Learning Methods

Teaching and Learning Methods	Duration in hours	Total Duration in Hours
Face to Face Lectures		
Demonstrations		
2. Demonstration using Videos		
2. Demonstration using Physical		
3. Demonstration on a Computer		
Numeracy		
1. Solving Numerical Problems		
PracticalWork		
1. Course Laboratory		
2. Computer Laboratory		
3. Engineering Workshop/Course Workshop/Kitchen		
4. Clinical Laboratory		
5. Hospital		
6. Model Studio		
Others		
1. Case Study Presentation		
2. Guest Lecture		
3. Industry/Field Visit		
4. Brain Storming Sessions		
5. Group Discussions		
6. Discussing Possible Innovations		
Written Examination (Term tests and SEE)		
Total Duration in Hours		

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7. Method of Assessment

The following is the CE components:

Laboratory Component CE	SEE
SC1 (Log book & Formative Laboratory performance assessment)	SEE

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60 Marks	60 Marks

8. Achieving learning outcomes

The following skills are directly or indirectly imparted to the students in the following teaching and learning methods

S.No	Curriculum and Capabilities Skills	How imparted during the course
1.	Knowledge	Clinical postings
2.	Understanding	Clinical postings
3.	Critical Skills	Clinical postings
4.	Analytical Skills	Clinical postings
5.	Problem Solving Skills	Clinical postings
6.	Practical Skills	Clinical postings
7.	Group Work	Clinical postings
8.	Self-Learning	Clinical postings
9.	Written Communication Skills	Clinical postings
10.	Verbal Communication Skills	Clinical postings
11.	Presentation Skills	Clinical postings
12.	Behavioral Skills	Clinical postings
13.	Information Management	Clinical postings
15.	Leadership Skills	Clinical postings

III. Course Resources

1. Essential Reading

- Course notes
- Allen R. Nissenson,Richard N. Fine Dialysis Therapy 3 edition (2001) Hanley &Belfus
- R. Gokal, Ramesh Khanna, Raymond T. Krediet , K.D. Nolph ,Textbook of Peritoneal Dialysis(2000) Springer2nd ed. edition
- John T. Daugirdas , Peter G. Blake , Todd S. Ing , Handbook of Dialysis, 5th edition (2014), Lippincott Williams and Wilkins;
- NANT and Oxford -Text books of Dialysis for technologists

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2. Recommended Reading

- Allen R. Nissenson,Richard N. Fine Dialysis Therapy 3 edition (2001) Hanley &
- William L. Henrich, Principles and Practice of Dialysis (Principles & Practice of Dialysis), 4th edition (2009) Lippincott Williams and Wilkins

3. Magazines and Journals

- Journal of Renal disorders and management

Websites:

- www.renal.org.
- Videos in the library
- http://bmj.com

IV. Course Organization

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