



# SRI MANAKULA VINAYAGAR ENGINEERING COLLEGE

(Approved by AICTE, New Delhi & Affiliated to Pondicherry University)  
(Accredited by NBA-AICTE, New Delhi, ISO 9001:2000 Certified Institution &  
Accredited by NAAC with "A" Grade)

(An Autonomous Institution)

Madagadipet, Puducherry - 605 107



## SCHOOL OF ALLIED HEALTH SCIENCES B.Sc. CARDIAC PERFUSION TECHNOLOGY

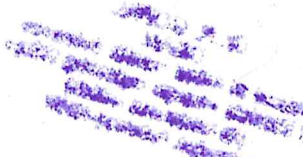
### Minutes of 2<sup>nd</sup> Board of Studies Meeting (UG)

The 2<sup>nd</sup> Board of Studies meeting for B.Sc. Cardiac Perfusion Technology was held on 11<sup>th</sup> April 2022 at 2.30 P.M in the Conference Hall, Sri Manakula Vinayagar Medical College with Head of the Department in the Chair.

The following members were present for the BoS meeting.

Sl. No.	Name of the Member	Designation
1	Dr.Devadass Assistant Professor Department of CTVS Sri Manakula Vinayagar Medical College and Hospital Puducherry Mail id : doccdevadoss@gmail.com PH: 9444141613	Chairman
2	Dr.M.Sudhakar Professor of Medicine Department of Medicine Arunai medical college and hospital Tiruvannamalai Mail id :drsudhagar7893@gmail.com PH:9944667893	(University Nominee) Subject Expert
3	Dr.B.V.SaiChandranMCh (CTVS). DNB (CTS). Deputy Medical Superintendent Professor & Head Dept. of Cardiothoracic & Vascular Surgery (CTVS). JIPMER Puducherry Mail id:bvschandran@gmail.com PH:9442525547	(Academic Council Nominee) Subject Expert
4	Dr.Riyaz Assistant Professor Department of CTVS Dhanalakshmi Srinivasan Medical College And Hospital Peramblaur Mail Id :Shahul9505@yahoo.com PH:7401516634	(Academic Council Nominee) Subject Expert
5	Dr.D.Duraimurugan Consultant General and Laparoscopic surgeon Department of Gastroenterology Durai Gastro Care, Villupuram Mail id:duraigastrocare@gmail.com PH:9443723677	Industrial Expert

  
**DR. R. GOPAL**  
DEAN  
School of Allied Health Sciences  
Sri Manakula Vinayagar Engineering College  
(An Autonomous Institute)  
Madagadipet, Puducherry - 605 107

  
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Sl. No.	Name of the Member	Designation
6	Mr.Sathish Senior Perfusionist Clinical Instructor Sri Manakula Vinayagar Medical College and Hospital Puducherry Mail id :sathishrajesh94@gmail.com PH:7598316152	Internal Member
7	Mr. Mohammed Altaf Junior Perfusionist Clinical Instructor Sri Manakula Vinayagar Medical College and Hospital Puducherry Mail id: altafmohammed2411@gmail.com PH:8428018762	Internal Member
8	Dr.B. Vengadesan Assistant Professor Department of Anatomy Sri Manakula Vinayagar Medical College and Hospital Mail Id:drvengivpm2011@gmail.com PH:9092713445	Internal Member
9	Mr.V.VinuBalan Lecturer Department of Physiology Sri Manakula Vinayagar Medical College and Hospital Mail Id:vinubalanv@gmail.com PH:9786859157	Internal Member
10	Mrs.R.Elakiya Assistant Professor Department of Biochemistry Sri Manakula Vinayagar Medical College and Hospital Mail Id:elakiya.20101991@gmail.com PH:8344986675	Internal Member
11	Mr.P.Anand Research scientist Department of Microbiology Sri Manakula Vinayagar Medical College and Hospital Mail Id:anandsachin@gmail.com PH:9629982312	Internal Member
12	Dr.V.Sriram Associate Professor Department of Pathology Sri Manakula Vinayagar Medical College & Hospital, Puducherry Mail id:sriram11988@gmail.com PH:9677786854	Internal Member

*Dr. R. GOPAL*  
DEAN  
Sri Manakula Vinayagar Engineering College  
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*[Faint blue stamp]*





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**Minutes of the 2<sup>nd</sup> Meeting of Members of BOS in Cardiac Perfusion Technology held on 11<sup>th</sup> April 2022**

## **Agenda 1/ BoS /2 /2022 /CPT/UG**

### **Welcome Address, Introduction about the Institution, Department and BoS Members**

The Dean, School of Allied Health Sciences welcomed the chairman and the members for the 2<sup>nd</sup> BOS meeting and briefed the members about the inception of school of AHS and the various courses offered by the institution and the strength of the students in different courses. The chairman of the Board of the studies introduced the new members to the university nominee and welcomed the members before commencing the discussion on the various items.

## **Agenda 2/ BoS /2 /2022 /CPT/UG**

### **Changes in the regulation regarding eligibility for admission.**

The Dean apprised the members about the proposal for changing the eligibility for admission to the 1<sup>st</sup> year of AHS courses pertaining to age and educational qualification as a uniform pattern for degree, diploma and certificate courses viz 17 years and 21 years of age as minimum and maximum respectively. The minimum education qualification for all the courses is also proposed to be uniform i.e. pass in higher secondary or its equivalent with 45% marks in aggregate which was approved by the members. **(Annexure-1)**

## **Agenda 3 BoS /2 /2022 /CPT/UG**

### **Review of the performance of the students in the last examination held in August and January 2022.**

The Head of the department apprised the board members about the performance of the students in the regular and supplementary examination held in August 2021 and January 2022. The members were informed that all the students have cleared the first year subjects.

## **Agenda 4/ BoS /2 /2022 /CPT/UG**

### **Review of the progress of the course, teaching schedule and proposed schedule of the next end year examinations.**

The Head of the department apprised the members about the progress of the Second year course which commenced in September 2021. The time table was reviewed and the dates of the next examination schedule for August 2022 was conveyed and approved by the members.

  
**Dr. R. GOPAL**  
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## **SRI MANAKULA VINAYAGAR ENGINEERING COLLEGE**

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### **Agenda 5/ BoS /2 /2022 /CPT/UG**

**To discuss and ratify the improvisations in the Curriculum and syllabi of the B.Sc., Cardiac Perfusion Technology under the Regulation of R-2020**

No changes were made in the Curriculum.

### **Agenda 6/ BoS /2 /2022 /CPT/UG**

#### **Changes in the eligibility for pass and reappearance**

The members were apprised of the proposed change in eligibility for pass in the subject i.e. minimum of 40% in theory (EYE) and 40% in practicals (EYE) and 40% in internal assessment examinations and 45% in aggregate. The candidate who fails in any subject shall have to appear for both theory and practicals in the subsequent examination which was approved by the members. In the subjects where there is only internal assessment examination the minimum pass marks shall be 40% in theory and 40% in practicals.

**(Annexure – II)**

### **Agenda 7/ BoS /2 /2022 /CPT/UG**

#### **Changes in the internship programme.**

The members were apprised of the proposed addition of mandatory internship of 6 months for diploma courses from the academic year 2022 – 2023 on wards which was approved by the members.

**(Annexure – II)**

**The meeting concluded at 3.30 PM with vote of thanks by the chairman.**

**Dr. R. GOPAL**  
**DEAN**  
**School of Allied Health Sciences**  
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## ANNEXURE – I

### PROPOSED CHANGES IN REGULATOIN OF AHS 2020 – 2021

#### 1. Admission – Eligibility

##### Age:

##### Existing

- a) Age limit for Certificate / Diploma / degree course

Should have completed 17 yrs of age but not completed 21yrs as on 31<sup>st</sup> December of the admitting academic year for degree course. No mention of age limit for certificate, diploma and lateral entry to degree course.

##### Proposed Change

The lower and upper limit shall be the same for certificate course, diploma, degree & lateral entry viz 17 yrs and 21 yrs respectively with relaxations as per the norms of SMVEC / Pondicherry University.

#### b) Educational Qualification

Existing: A pass in higher secondary examination for degree and pass in 10<sup>th</sup> class for diploma & certificate course.

Proposed: A pass in higher secondary programme with at least 45% in aggregate for all programmes viz certificate, diploma & degree courses with relaxations as per the norms of SMVEC / Pondicherry University.

Dr. R. GOPAL  
DEAN  
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## ANNEXURE - II

### PROPOSED CHANGES IN REGULATIONS OF AHS 2020 – 2021

#### 1. Eligibility for Pass:

##### Existing:

Minimum Mark for Pass in the subject

EYE (Theory) ..... 40%

EYE (Practicals) ..... 40%

Internal Assessment (CAT) (Theory) ..... 40%

Internal Assessment (CAT) (Practicals) ..... 40%

Viva Voce (Orals) .....40%

Aggregate of Theory + Practical + Viva = 50% of grand total in the subject.

##### ❖ Viva marks added to theory

##### Proposed:

Minimum Mark for Pass in the subject

EYE (Theory) .....40%

EYE (Practicals) .....40%

Internal Assessment (CAT) (Theory) .....40%

Internal Assessment (CAT) (Practicals) .....40%

Aggregate of Theory (EYE) + Practical (EYE) + Viva+ CAT = 45% of grand total in

the subject.

##### ❖ Viva marks added to aggregate of theory and practicals

A candidate who fails shall appear for both theory and practicals in the subsequent examination irrespective of the score in theory and practicals of the preceding examination.

##### Carry Over:

Existing: No mention about carry over.

Proposed: The student should have passed all the papers of the 1<sup>st</sup> and 2<sup>nd</sup> year to be eligible to appear for the 3<sup>rd</sup> year subjects.

#### 2. Reappearances:

##### Existing:

Candidate who fails in any subject shall reappear in the part (Theory / Practical) in which he has scored less than 50% of marks.

##### Proposed:

Candidate who fails by want of minimum marks of 40% in any part i.e. theory / practicals and less than 45% in aggregate shall reappear for both theory and practicals in the subsequent examination.





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## ANNEXURE - II

### 3. Internship

Existing:

- a) Diploma Courses: 6 months of optional internship.

**Proposed:** 6 months of internship for diploma courses to enhance their knowledge, skills and for better job opportunities.

- a) Extension: Any candidate who does not put up the required attendance of 80% shall be required to undergo the training for the required period failing which he/she will not be granted course completion certificate.

- b) Log Book: The student shall maintain a log book during the period of internship which shall be certified by the Head of the department concerned.

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Dean  
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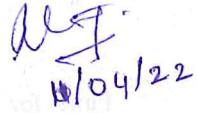
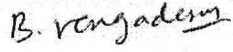
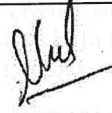

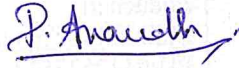

## SCHOOL OF ALLIED HEALTH SCIENCES

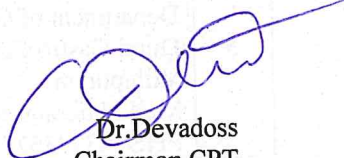
2<sup>nd</sup> Board of studies meeting -11/04/2022

### Panel for the Board of Studies – B.Sc., CARDIAC PERFUSION TECHNOLOGY

Sl. No.	Name of the Member	Designation	Signature
1	Dr.Devadass Assistant Professor Department of CTVS Sri Manakula Vinayagar Medical College and Hospital Puducherry Mail id : doccdevadoss@gmail.com PH: 9444141613	Chairman	
2	Dr.M.Sudhakar Professor of Medicine Department of Medicine Arunai medical college and hospital Tiruvannamalai Mail id :drsudhagar7893@gmail.com PH:9944667893	(University Nominee) Subject Expert	
3	Dr.B.V.SaiChandranMCh (CTVS). DNB (CTS). Deputy Medical Superintendent Professor & Head Dept. of Cardiothoracic & Vascular Surgery JIPMER Puducherry Mail id:bvschandran@gmail.com PH:9442525547	(Academic Council Nominee) Subject Expert	
4	Dr.Riyaz Assistant Professor Department of CTVS DhanalakshmiSrinivasan Medical College And Hospital Perambalur Mail Id :Shahul9505@yahoo.com PH:7401516634	(Academic Council Nominee) Subject Expert	
5	Dr.D.Duraimurugan Consultant General and Laparoscopic surgeon Department of Gastroenterology Durai Gastro Care Villupuram Mail id:duraigastrocare@gmail.com PH:9443723677	Industrial Expert	
6	Mr.Sathish Senior Perfusionist Clinical Instructor Sri Manakula Vinayagar Medical College and Hospital Puducherry Mail id :sathishrajesh94@gmail.com PH:7598316152	Internal Member	



7	Mr. Mohammed Altaf Junior Perfusionist Clinical Instructor Sri Manakula Vinayagar Medical College and Hospital Puducherry Mail id: altafmohammed2411@gmail.com PH:8428018762	Internal Member	 10/04/22
8	Dr.B. Vengadesan Assistant Professor Department of Anatomy Sri Manakula Vinayagar Medical College and Hospital Mail Id:drvengivpm2011@gmail.com PH:9092713445	Internal Member	
9	Mr.V.VinuBalan Lecturer Department of Physiology Sri Manakula Vinayagar Medical College and Hospital Mail Id:vinubalanv@gmail.com PH:9786859157	Internal Member	
10	Mrs.R.Elakiya Assistant Professor Department of Biochemistry Sri Manakula Vinayagar Medical College and Hospital Mail Id:elakiya.20101991@gmail.com PH:8344986675	Internal Member	
11	Mr.P.Anand Research scientist Department of Microbiology Sri Manakula Vinayagar Medical College and Hospital Mail Id:anandhsachin@gmail.com PH:9629982312	Internal Member	
12	Dr.V.Sriram Associate Professor Department of Pathology Sri Manakula Vinayagar Medical College & Hospital, Puducherry Mail id:sriram11988@gmail.com PH:9677786854	Internal Member	

  
Dr. Devadoss  
Chairman, CPT



Dr.R .Gopal  
Dean-AHS

DR. R. GOPAL  
DEAN  
School of Health Sciences  
Sri Manakula Vinayagar Engineering College  
(An Autonomous Institute)  
Gladagudipal, Puducherry-605007

Dr. V.S.K. Venkatachalapathy  
Director cum Principal

## COLLEGE VISION AND MISSION

### VISION

To be globally recognized for excellence in quality education, innovation and research for the transformation of lives to serve the society.

### MISSION

#### M1: Quality Education:

To provide comprehensive academic system that amalgamates the cutting edge technologies with best practices.

#### M2: Research and Innovation:

To foster value based research and innovation in collaboration with industries and institutions globally for creating intellectuals with new avenues.

#### M3: Employability and Entrepreneurship:

To inculcate the employability and entrepreneurial skills through value and skill based training.

#### M4: Ethical Values:

To instill deep sense of human values by blending societal righteousness with academic professionalism for the growth of society.

## DEPARTMENT OF CARDIAC PERFUSION TECHNOLOGY

### VISION AND MISSION

#### VISION

To advance human health through excellence in medical education, delivering patient centered services transformative research technologically advanced medical education, and exceptional clinical and preventive care, leading to healthier communities.

#### MISSION

##### M1: knowledge sharing:

- To impart basic, theoretical, practical and professional knowledge of high quality for overall holistic growth of every student.

##### M2: Collaborative learning:

- To develop innovative educational activities and participate in public health reforms through training, research and intervention in the field of laboratory sciences, medicine and education

##### M3: Career Development:

- Prepare for satisfying employment, and develop successful lifelong career plans in an evolving global world of work.

##### M4: Consistent Improvement:

- Strive for excellence in the scientific, professional and humanistic aspects of their chosen discipline.







## B. Sc. CARDIAC PERFUSION TECHNOLOGY

### DISTRIBUTION OF TEACHING HOURS FOR 1<sup>ST</sup> YEAR COURSES

Subject	Lecture	Practicals	Total
ANATOMY	60	40	100
PHYSIOLOGY	60	40	100
BIO-CHEMISTRY	60	40	100
MICROBIOLOGY	60	40	100
PATHOLOGY	60	40	100
ENGLISH	25	25	50
COMPUTER SCIENCE	25	25	50
<b>Clinical Posting</b>	-	300	300
<b>Total</b>	<b>350</b>	<b>550</b>	<b>900</b>

### DISTRIBUTION OF MARKS FOR 1<sup>ST</sup> YEAR COURSES

Course Code	Course	Theory								Practicals						Grand Total	
		*EYE		**CAT		Viva		Total		*EYE		***CAT		Total			
		Max	Min	Max	Min	Max	Min	Max	Min	Max	Min	Max	Min	Max	Min	Max	Min
U20CTAT11	ANATOMY	60	24	20	8	20	8	100	40	40	16	20	8	60	24	160	80
U20CTAT12	PHYSIOLOGY	60	24	20	8	20	8	100	40	40	16	20	8	60	24	160	80
U20CTAT13	BIO-CHEMISTRY	60	24	20	8	20	8	100	40	40	16	20	8	60	24	160	80
U20CTAT14	MICROBIOLOGY	60	24	20	8	20	8	100	40	40	16	20	8	60	24	160	80
U20CTAT15	PATHOLOGY	60	24	20	8	20	8	100	40	40	16	20	8	60	24	160	80
U20CTAT16	ENGLISH	-	-	-	-	-	-	-	-	-	-	50	25	50	25	50	25
U20CTAT17	COMPUTER SCIENCE	-	-	-	-	-	-	-	-	-	-	50	25	50	25	50	25
<b>TOTAL</b>		-	-	-	-	-	-	<b>500</b>	<b>200</b>	-	-	-	-	<b>400</b>	<b>170</b>	<b>900</b>	<b>450</b>

\*EYE Examination, \*\*CAT Internal Assessment in Theory (Test 15 marks + Attendance 5 marks)

\*\*\*CAT Practicals (Test 10 marks + Attendance 5 marks+ record books 5Marks)

Minimum Marks for Pass is 40% in EYE& CAT in Theory &Practicals separately.

Minimum Marks for Pass in Ancillary Subjects is 50%.

Minimum Marks for Pass is 50% in aggregate of both Theory &Practicals combined.



AHS-B.Sc.Cardiac Perfusion Technology



## B. Sc. CARDIAC PERFUSION TECHNOLOGY

### DISTRIBUTION OF TEACHING HOURS FOR 2<sup>ND</sup> YEAR COURSES

Subject	Lecture	Practicals	Total
APPLIED PATHOLOGY & APPLIED MICROBIOLOGY	60	40	100
INTRODUCTION TO PERFUSION TECHNOLOGY	60	40	100
MEDICINE RELEVANT TO PERFUSION TECHNOLOGY	30	-	30
PHARMACOLOGY	30	-	30
ENVIRONMENTAL SCIENCE AND COMMUNITY MEDICINE	30	-	30
CLINICAL POSTING	-	1200	1200
<b>TOTAL</b>	<b>270</b>	<b>1320</b>	<b>1590</b>

### DISTRIBUTION OF MARKS FOR 2<sup>ND</sup> YEAR COURSES

Course Code	Course	Theory								Practicals						Grand Total	
		*EYE		**CAT		Viva		Total		*EYE		***CAT		Total			
		Max	Min	Max	Min	Max	Min	Max	Min	Max	Min	Max	Min	Max	Min	Max	Min
U20CPTT21	APPLIED PATHOLOGY & APPLIED MICROBIOLOGY	60	24	20	8	20	8	100	40	40	16	20	8	60	24	160	80
U20CPTT22	INTRODUCTION TO PERFUSION TECHNOLOGY	60	24	20	8	20	8	100	40	40	16	20	8	60	24	160	80
U20CPTT23	MEDICINE RELEVANT TO PERFUSION TECHNOLOGY	-	-	50	25	-	-	50	25	-	-	-	-	-	-	50	25
U20CTAT21	PHARMACOLOGY	-	-	50	25	-	-	50	25	-	-	-	-	-	-	50	25
U20CTAT22	ENVIRONMENTAL SCIENCE AND COMMUNITY MEDICINE	-	-	50	25	-	-	50	25	-	-	-	-	-	-	50	25
<b>TOTAL</b>		-	-	-	-	-	-	350	155	-	-	-	-	120	48	470	235

\*EYE Examination, \*\*CAT Internal Assessment in Theory (Test 15 marks + Attendance 5 marks)

\*\*\*CAT Practicals (Test 10 marks + Attendance 5 marks+ record books 5Marks)

Minimum Marks for Pass is 40% in EYE& CAT in Theory &Practicals separately.

Minimum Marks for Pass in Ancillary Subjects is 50%.

Minimum Marks for Pass is 50% in aggregate of both Theory &Practicals combined.



## B. Sc. CARDIAC PERFUSION TECHNOLOGY

### DISTRIBUTION OF TEACHING HOURS FOR 3<sup>RD</sup> YEAR COURSES

Subject	Lecture	Practicals	Total
PERFUSION TECHNOLOGY-CLINICAL	50	100	150
PERFUSION TECHNOLOGY-APPLIED	50	100	150
PERFUSION TECHNOLOGY -ADVANCED	50	100	150
BIostatISTICS AND ETHICS AND PATIENT CARE	20	10	30
CLINICAL POSTING	-	1200	1200
<b>TOTAL</b>	<b>170</b>	<b>1510</b>	<b>1680</b>

### DISTRIBUTION OF MARKS FOR 3<sup>RD</sup> YEAR COURSES

Course Code	Course	Theory								Practicals						Grand Total	
		*EYE		**CAT		Viva		Total		*EYE		***CAT		Total			
		Max	Min	Max	Min	Max	Min	Max	Min	Max	Min	Max	Min	Max	Min	Theory+ Practical	
																Max	Min
U20CPTT31	PERFUSION TECHNOLOGY-CLINICAL	60	24	20	8	20	8	100	40	40	16	20	8	60	24	160	80
U20CPTT32	PERFUSION TECHNOLOGY-APPLIED	60	24	20	8	20	8	100	40	40	16	20	8	60	24	160	80
U20CPTT33	PERFUSION TECHNOLOGY -ADVANCED	60	24	20	8	20	8	100	40	40	16	20	8	60	24	160	80
U20CTAT31	BIostatISTICS AND ETHICS AND PATIENT CARE	-	-	50	25	-	-	50	25	-	-	-	-	-	-	50	25
<b>TOTAL</b>		-	-	-	-	-	-	350	145	-	-	-	-	180	72	530	265

\*EYE Examination, \*\*CAT Internal Assessment in Theory (Test 15 marks + Attendance 5 marks)

\*\*\*CAT Practicals (Test 10 marks + Attendance 5 marks+ record books 5Marks)

Minimum Marks for Pass is 40% in EYE& CAT in Theory &Practicals separately.

Minimum Marks for Pass in Ancillary Subjects is 50%.

Minimum Marks for Pass is 50% in aggregate of both Theory &Practicals combined.

AHS-B.Sc.Cardiac Perfusion Technology





**I-YEAR SYLLABUS**

<b>U20CTAT11</b>	<b>ANATOMY</b>	<b>L</b>	<b>P</b>	<b>Hrs</b>
		<b>60</b>	<b>40</b>	<b>100</b>

**HUMAN BODY AS A WHOLE**

1. Anatomical position
2. Fundamental planes of the body
3. Anatomical terms (superior, inferior, medial, lateral, proximal and distal)
4. Organization of human body
5. Parts of microscope and its functions
6. Epithelium
  - Types
  - functional importance with examples

**LOCOMOTOR SYSTEM**

**Skeletal system**

1. Bone composition
2. Long bone
  - Parts
  - blood supply with clinical implication
3. Identify major bones of the body and their parts
4. Classification of synovial joints with associated movements
5. Articular surface of key joints in human body
6. Parts of a muscle and its arrangement
7. Classification of muscles with functional importance
8. Muscles of upper limb, lower limb and head and neck with actions

**NERVOUS SYSTEM**

Classification and components of nervous system

1. Spinal cord
  - Coverings
  - Extent
  - Organization of grey matter and white matter with clinical implication
2. Brainstem
  - Parts
  - Location of cranial nerve nucleus with functions
3. Cerebellum
  - Location
  - Parts
  - Functional subdivisions
  - blood supply and functions



## Curriculum and Syllabi R-2020

4. Cerebrum
  - Surfaces
  - important sulci and gyro and functional correlation
5. Thalamus
  - location and functional correlation
  - Striatum, hippocampus and Amygdala – their location and function.
6. Cranial nerves
  - Names
  - location of nucleus with clinical correlation

### **CIRCULATORY SYSTEM**

1. General plan of circulatory system
2. Difference between systemic and portal circulation
3. Microanatomy of artery and vein
4. Thoracic cavity
  - Bony cage
  - muscles – intercostal muscles, diaphragm
5. Mediastinum – sub-divisions, contents
6. Heart
  - Coverings
  - External features
  - Chambers
  - Blood supply
  - Nerve supply.
7. Major vessels of the heart
8. Veins of upper limb and lower limb - varicose veins and their importance
9. Lymphatic system – components, microanatomy of lymphoid organs (lymph node, tonsil, thymus, spleen)

### **RESPIRATORY SYSTEM**

1. Nasal cavity, Para-nasal air sinuses, nasal septum, lateral wall of nose – location and functions
2. Pharynx – subdivision and structures present
3. Larynx – cartilages, muscles and nerve supply
4. Trachea and bronchial tree – extent, broncho-pulmonary segments and their clinical importance
5. Pleura – types, reflections, recesses and its clinical importance
6. Lung – location, relations, lobes, fissures, surfaces.

### **DIGESTIVE SYSTEM**

1. Abdomen
  - Quadrants
  - Musculature of wall
  - Formation in inguinal canal
  - Rectus sheath and their importance



## Curriculum and Syllabi R-2020

2. Components of digestive system.
3. Mouth - Tongue, palate – Structure of tongue
4. Salivary glands – parotid, sub-mandibular – Brief anatomy and structure
5. Stomach
  - Position
  - Parts
  - Blood supply
  - Nerve supply
  - Lymphatic drainage
  - Relations & structure
6. Small intestine – subdivisions
7. Large intestine in general - sub-divisions, microscopic structure. Specific - caecum and appendix
8. Accessory organs of digestive system
  - Liver
  - Pancreas
  - Extra hepatic biliary apparatus - Gross features, relations, blood supply

## EXCRETORY AND REPRODUCTIVE SYSTEMS

1. Kidney
  - Location
  - Parts
  - Relations and blood supply
2. Ureter & urinary bladder
  - Location
  - Parts
  - Relations and blood supply
3. Male reproductive system
  - Testis
  - Spermatic cord and its coverings
4. Female reproductive system
  - Ovary
  - Uterus – parts and supports
5. Accessory organs of reproduction
  - Prostate gland
  - Mammary gland

## ENDOCRINE SYSTEM

1. List the endocrine glands and their location
2. Thyroid and parathyroid glands
  - Location
  - Relations
  - Blood supply
  - Functions & clinical importance
3. Pituitary gland
  - Location





## Curriculum and Syllabi R-2020

- Parts
  - Relations
  - Blood supply
  - Functions & clinical importance
4. Supra renal gland
- Location
  - Parts
  - Relations
  - Blood supply
  - Functions & clinical importance

### REFERENCE BOOKS:

1. Basics in human anatomy for B.Sc. Paramedical courses, second edition – Priya Ranganath and Leelavathy
2. Anatomy & Physiology in health & illness, 11th edition - Ross & Wilson
3. Vishram Singh, "Clinical and Surgical Anatomy", Elsevier Health Sciences, 2<sup>nd</sup> Edition, 2019.
4. Sampath Madhyastha, "Manipal Manual of Anatomy For Allied Health Sciences", CBS Publishers & Distributors, 3<sup>rd</sup> Edition, 2020.
5. Richard Drake A. Wayne Vogl Adam Mitchell, "Gray's Anatomy for Students – Companion Work Book", Churchill Livingstone Publications, 4<sup>th</sup> Edition, 2019.
6. A K Datta, "Principles Of General Anatomy", Current Books International, 8<sup>th</sup> Edition, 2018.
7. Nafis Ahmad Faruqi, "Human Osteology", CBS Publishers & Distributors, 3<sup>rd</sup> Edition, 2018.
8. Inderbir Singh, "Human Histology", Jaypee Publications, 9<sup>th</sup> Edition, 2019.



## ANATOMY LAB

### PRACTICALS - 40 hrs

1. Identification of the parts of the microscope.
2. Identification of the epithelium in a given histological slide.
3. Demonstrate the parts of the long bone.
4. Identification of the bones and joint of the body with the articular surfaces (skeleton or X-rays)
5. Identification of the important muscles in upper limb, lower limb and head and neck.
6. Identification of the parts of the brain (cerebrum, cerebellum, brainstem, spinal cord)
7. Identification of the cardiac chambers in a specimen.
8. Identification of the major vessels of heart – aorta and pulmonary trunk.
9. Identification of the cardiac field in chest X-ray.
10. Identification of the nasal cavity, naso pharynx, trachea, lung and pleura in a givenspecimen.
11. Identification of the lung shadow, costophrenic angle in a chest X-ray.
12. Identification of the stomach, pancreas, liver, small intestine and large intestine specimens.
13. Identification of the stomach, intestinal shadows in plain or contrast abdomen X – ray.
14. Identification of the kidney, Ureter and urinary bladder in specimen.
15. Identification of the renal pelvis, Ureter and urinary bladder in intravenous pyelogram
16. Identification of the thyroid gland in cadaveric specimen



**U20CTAT12**

**PHYSIOLOGY**

<b>L</b>	<b>P</b>	<b>Hrs</b>
<b>60</b>	<b>40</b>	<b>100</b>

### **THE CELL**

- Cell Structure and functions of the various organelles.
- Endocytosis and Exocytosis
- Acid base balance and disturbances of acid base balances (Alkalosis, Acidosis)

### **CARDIO VASCULAR SYSTEM**

- Physiology of the heart
- Heart sounds
- Cardiac cycle
- Cardiac output.
- Auscultatory areas.
- Arterial Pressures,
- Blood Pressure
- Hypertension
- Electro cardiogram(ECG)

### **BLOOD:**

- Composition of Blood, functions of the blood and plasma proteins, classification and protein.
- Pathological and Physiological variation of the RBC.
- Function of Hemoglobin
- Erythrocyte Sedimentation Rate (ESR).
- Detailed description about WBC •Total count (TC), Differential count (DC) and functions.
- Platelets–formation

### **RESPIRATORY SYSTEM:**

- Respiratory movements.
- Definitions and Normal values of Lung volumes and Lung capacities.

### **EXCRETORY SYSTEM**

- Normal Urinary output
- Micturition
- Renal function tests, renal disorders.

### **REPRODUCTIVE SYSTEM**

- Formation of semen and spermatogenesis.
- Brief account of Menstrual Cycle ,oogenesis





## Curriculum and Syllabi R-2020

### **CENTRAL NERVOUS SYSTEM**

- Functions of CSF
- Reflexes.
- Sympathetic and parasympathetic outflow Impulse conduction
- Structure of neuron
- Degeneration and regeneration of nerve fibers Cerebral blood flow

### **ENDOCRINE SYSTEM**

- Functions
- Pituitary
- Thyroid
- Parathyroid
- Adrenal
- Pancreatic Hormones

### **DIGESTIVE SYSTEM**

- Physiological Anatomy of the GIT.
- Food Digestion in the mouth, stomach ,intestine
- Absorption of foods
- Role of bile indigestion.

### **SPECIAL SENSES**

### **REFERENCE BOOKS:**

1. Raj Kapoor," Physiology Practical Manual for Allied Health Sciences", CBS Publishers and Distributors Pvt Ltd, 3<sup>RD</sup>Edition.
2. Marya, "Medical Physiology", CBS Publishers and Distributors Pvt Ltd, 4thEdition.
3. CL Ghai, "Text Book of Practical Physiology", Jaypee Brothers Medical Publishers, 9<sup>th</sup>Edition.
4. Vidya Rattan, "Hand Book of Human Physiology", Jaypee Brothers,7<sup>th</sup>Edition.
5. Robin R. Preston &Thad Wilson, " Lippincotts Illustrated Reviews in Physiology", Lippincott Williams and Wilkins, 2<sup>nd</sup> Edition.



## PHYSIOLOGY LAB

### PRACTICAL – 40 hrs

1. Microscope
2. Estimation Hemoglobin
3. Blood grouping
4. BT and CT
5. RBC count
6. WBC count
7. PCV
8. ESR
9. Osmotic fragility
10. DLC
11. Measurement of Pulse,HR,RR, Temperature,SPo2
12. Measurement of Blood pressure and auscultate Heart sounds
13. Spotters



**U20CTAT13**

**BIOCHEMISTRY**

<b>L</b>	<b>P</b>	<b>Hrs</b>
<b>60</b>	<b>40</b>	<b>100</b>

**CELL AND CELL ORGANELLES**

Structure and functions of Cell organelle, membrane structure and transporters

**CARBOHYDRATES**

Classification, properties and functions of carbohydrates, Glycolysis, Diabetes Mellitus

**LIPIDS**

Classification and functions of lipids, Normal value and functions of Lipoproteins, ketone bodies and ketosis, pathogenesis of Atherosclerosis, cardiac biomarkers

**PROTEINS**

Classification of Amino acids , Classification and properties of proteins, Normal value of plasma proteins and their functions.

**ENZYMES**

Classification, co-enzymes, Iso-enzymes, enzyme measurement units, enzyme profile in different disorders

**VITAMINS**

Functions and deficiency manifestations of fat soluble vitamins, Co-enzyme form, functions and deficiency manifestations of water soluble vitamins.

**MINERALS**

Functions and disorders related to minerals like calcium, iron, copper, zinc, iodine, sodium, potassium and chloride.

**NUTRITION**

Calorific value of foods, Basal Metabolic Rate, Protein Energy Malnutrition.

**ORGAN FUNCTION TEST**

Liver function Test, Renal Function Test, Thyroid Function Test

**ACID BASE BALANCE AND IMBALANCE**

pH, Henderson- Hasselbalch equation, buffers, Disorders of Acid base imbalance

**SAMPLE COLLECTION AND TRANSPORT**

Types of samples, Anticoagulants, Phlebotomy, Sample Transport



## Curriculum and Syllabi R-2020

### REFERENCE BOOKS:

1. Allan Gaw, "Clinical Biochemistry – An Illustrated Colour Text", Churchill Livingstone, 3<sup>rd</sup> edition
2. Nanda Maheshwari, "Clinical Biochemistry", Jaypee brothers medical publishers, 2<sup>nd</sup> edition
3. Victor Rodwell, "Harper's Illustrated Biochemistry", McGraw-Hill Education, 31<sup>st</sup> edition
4. DmVasudevan, "Text Book of Biochemistry", Jaypee Brothers Medical Publishers, 9<sup>th</sup> edition
5. Harold Varley, "Practical Clinical Biochemistry", CBS, 6<sup>th</sup> edition



## BIOCHEMISTRY LAB

### PRACTICALS – 40 hrs

1. Preparation of solutions: Standard solutions, working solutions, calculation of concentrations
2. Acidimetry and alkalimetry: Preparation of different types of buffers, determination of pH by pH papers, indicators and pH meters
3. General reactions and identification of carbohydrates
4. General reactions of proteins, colour reaction of amino acids
5. Demonstration of electrophoresis of serum proteins and Hb
6. Demonstration of paper chromatography and calculation of Rf value
7. Verification of Beer-Lamberts law Quantitative experiments



<b>U20CTAT14</b>	<b>MICROBIOLOGY</b>	<b>L</b>	<b>P</b>	<b>Hrs</b>
		<b>60</b>	<b>40</b>	<b>100</b>

### **GENERAL BACTERIOLOGY**

- **History of Microbiology:** Theory of biogenesis and a biogenesis pioneers in Microbiology (Robert Koch, Louis Pasteur, Joseph lister, Paul enrich, and Koch Postulates.
- **Morphology of bacteria:** Classification based on shape, Anatomy of the bacterial cell, defective forms of bacteria, Bacterial appendages, Bacterial Spore
- **Physiology of bacteria:** Autotrophs, Heterotrophs, Bacterial growth and replication, Bacterial Growth curve, Bacterial count, Bacterial nutrition, Factors affecting the growth.
- **Sterilization & Disinfection:** Introduction, Physical methods, Chemical methods, methods of sterilization and disinfection of medical and laboratory equipments, Disinfection of clinical samples and environmental surfaces in laboratory and hospitals, Testing fordisinfectant.
- **Culture media:** Introduction, basal media, synthetic media, special media with emphasis on their uses.
- **Culture methods:** Aerobic and Anaerobic culture methods.

### **IMMUNOLOGY**

- Infection - types, Route, source of infections, vector, factors affecting virulence, Exotoxins endotoxins
- Antigen – types factors affecting antigenicity
- Antibodies (Immunoglobulin's)- general properties, IGg, IGA, IGM,IGE,IGD
- Immunity- Innate immunity, Factor affecting & mechanisms of innate immunity Acquired immunity, active & passive
- Ag – Ab reactions – general properties, slide & tube agglutination, precipitation (slide flocculation) prozonephenomeno, coombs test, immune fluorescence assay, Elisa (direct &Indtect) , Immuno chromatography , Applications of Antigen antibodies reactions
- Immune system - cells of lymphoreticular system- lymphocytes, phagocytes structure and functions
- Immune response – humoral& cell mediated immune response, monoclonal antibodies factor affecting anti bodies, adjuvants ,immuno suppressive agents, interleukins , immunological tolerance
- Hypersensitivity- Types- immediate &delayed , Type I, IV Hypersensitivity

### **SYSTEMIC BACTERIOLOGY**

Bacterial infections – morphology, pathology, clinical feature, lab diagnosis, treatment prevention including immune prophylaxis of the following pathogens. No description of culture characters and biochemical reactions

- Staphylococcus
- Streptococcus
- Enterococcus
- Pneumococcus
- C.diphtheriae
- Clostridium tetani
- Clostridiumperfringens
- Mycobacterium tuberculosis
- Mycobacteriumleprae



## Curriculum and Syllabi R-2020

- E.coli
- KlebsiellaPneumoniae
- Salmonella typhi
- Pseudomonas saeruginosa
- Treponemapallidum
- Vibreo cholera

### VIROLOGY

- Introduction and General properties of viruses morphology and general characters susceptibility to physical chemical agents , viral heamaggluinations , cultivations of viruses, cytopathic effects
- Morphology, pathology, clinical feature, lab diagnosis, treatment prevention including immune prophylaxis of the following pathogens:
  - Herpes simplex
  - Varicella zoster
  - Dengue
  - Rabies
  - Hepatitis A,B,C
  - H.I.V
  - Influenza virus
  - Corona virus
  - Measles , mumps &rubella

### MYCOLOGY

Introduction – Morphology, General characteristics, classifications, outline of lab diagnosis, Morphology Pathology, clinical feature, lab diagnosis, treatment prevention of the following pathogens

- Candida
- Cryptococcus
- Aspergilluspp

**PARASITOLOGY** Introduction, General Characteristics, Classifications, Brief description of Morphology, Pathogenesis,

Lab diagnosis, Prevention of the following Parasites:

- E.Histolytica
- Giardia
- Malarial Parasite
- Roundworm
- Hookworm

### APPLIED MICROBIOLOGY

- BMWM
- Immunization
- H.A.I & H.I.C
- Standard Precaution





## Curriculum and Syllabi R-2020

### REFERENCE BOOKS:

1. Richard A Harvey, "Lippincotts Illustrated Reviews In Microbiology", Lippincotts Williams &Wilkins, 3<sup>rd</sup> Edition.
2. Thao Doan, "Lippincotts Illustrated Reviews Immunology", Lippincotts Williams & Wilkins, 2<sup>nd</sup> Edition.
3. ApurbaSastry, "Textbook Of Essentials Of Practical Microbiology", Jaypee Brothers,
4. 1<sup>st</sup> Edition.
5. Baveja, "Textbook Of Practical Microbiology, Arya Publications", 4<sup>th</sup>Edition.
6. JayaramPanikar," Textbook Of Microbiology", Orient Black swan Pvt Limited, 9<sup>th</sup> Edition.
7. Baveja, "Textbook Of Microbiology", Arya Publications, 6<sup>th</sup>Edition.
8. Baveja, "Textbook Of Parasitology" , Arya Publications, 4<sup>th</sup>Edition



## MICROBIOLOGY LAB

### PRACTICALS – 40 hrs

1. Microscope – compound ,DGM, Florescence Microscope
2. Morphology of bacteria
3. Motility – hanging Drop & WET MOUNT
4. Sterilization &Disinfection - Demonstration of equipments and methods
  - Hot air oven, autoclave, ETO, heap filter, syringe filter physical & biological indicators of sterility
  - Packing of glassware and instruments for sterilizations
  - Visit to CSSD
5. Demonstration and use of Centrifuge, & distillation still
6. Preparation of smear from specimen and simple staining
7. Grams stain
8. Culture media
9. Slide and tube agglutination
10. Immuno chromatography
11. Study of bacteria pathogens
  - Staphylococcus
  - Streptococcus
  - Pneumococcus
  - C.diphtheriae
  - Clostridium tetani
  - Clostridium perfringens
  - Mycobacterium tuberculosis
  - Mycobacterium leprae
12. Serological test (ASO, CRP, RAF, Widal, VDRL, HIV, HBV ,Dengue)
13. Study of fungal pathogens
  - Candida
  - Dermatophytes
14. BMWM
15. PPE
16. Standard precautions
17. Examination of stools for parasites
  - E. histolytica
  - G.lamblia
  - Roundworm
  - Hook worm
  - Strongyloides



Curriculum and Syllabi R-2020

**U20CTAT15**

**PATHOLOGY**

L	P	Hrs
60	40	100

Introduction to Pathological Terms, techniques  
Cellular adaptations  
Inflammation (Acute & Chronic) Transudate & Exudate  
Wound healing and repair.

**HEMODYNAMICS**

- Oedema
- Thrombus
- Emboli
- Shock

**IMMUNOLOGY**

- Hypersensitivity reactions
- HIV
- Transplant rejection
- SLE

**NEOPLASIA**

- Benign and malignant tumors
- In situ growth
- Familial cancers
- Metastasis

**GENETICS**

- Chromosome aberrations
- congenital & developmental anomalies

**ENVIRONMENTAL**

- Radiation injury
- Nutritional deficiencies

**INFECTIONS**

- Leprosy
- Syphilis
- Tuberculosis
- Malaria
- Filaria



## Curriculum and Syllabi R-2020

Anaemia and lab investigations  
Blood grouping & cross matching  
WBC disorders – Leukemias

### **BLEEDING AND PLATELET DISORDERS**

- BT ( bleeding time)
- CT ( clotting time)
- PT ( prothrombin time)
- APTT ( activated partial thromboplastin time )

### **RESPIRATORY SYSTEM**

- Asthma
- COPD
- Pneumonia & Lung tumours
- pneumoconiosis

### **CVS (CARDIO VASCULAR SYSTEM)**

- Atherosclerosis
- Aneurysms
- Hypertension
- Myocardial Infarction
- Rheumatic heart disease
- Infective endocarditis

### **GIT (gastro intestinal tract)**

- Peptic ulcer
- Carcinoma Stomach
- Amoebiasis
- Typhoid
- TB Intestine
- Carcinoma Intestine

### **HEPATOBIILIARY**

- Liver abscess
- Hepatitis
- Cirrhosis
- Chole Cystitis
- Tumours of liver & gall bladder





## Curriculum and Syllabi R-2020

### **RENAL**

- Nephrotic syndrome
- Nephritic syndrome
- Renal calculi
- Renal failure
- RCC ( renal cell carcinoma)
- CPN ( chronic poly nephritis)

### **BREAST**

- Benign lesions of breast
- Carcinoma breast

### **FGT**

- Carcinoma cervix and endometrium
- Ovarian tumours
- PCOD ( polycystic ovarian disease)
- Leiomyoma

### **CNS( central nervous system)**

- Hydrocephalus
- Meningitis
- Encephalitis
- Cerebro vascular Disease

### **ENDOCRINE**

- Diabetes
- Thyroid disorders

### **EYE**

- Infections
- Tumors
- Metabolic diseases

### **BONE**

- Osteomyelitis
- Arthritis
- Osteoporosis
- Bone tumours



**REFERENCE BOOKS:**

1. NayakRamadas, "Textbook Of Pathology For Allied Health Sciences" ,Jaypee Brothers 1<sup>st</sup> Edition.
2. Nanda Maheshwari, "Clinical Pathology/Hematology and Blood Banking" (For DMLT Students), Jaypee Brothers, 3<sup>rd</sup> Edition.
3. NayakRamadas, "Histopathology Techniques & Its Management", Jaypee Brothers, 1<sup>st</sup> Edition.
4. RamnikSood, "Concise Book of Medical Laboratory Technology Methods and Interpretations", Jaypee Brothers, 2<sup>nd</sup> Edition.
5. Dacie&Lewis, "Practical Hematology", Elsevier Health – Uk, 11th Edition.
6. Lippincotts Illustrated Reviews in Pathology.



**PATHOLOGY LAB**

**PRACTICALS – 40 hrs**

1. Urine Examination
2. Hemoglobin Estimation
3. Blood Grouping
4. Peripheral Blood Smear staining
5. Differential count
6. Gross Pathology
7. Microscopic Slides
8. Instruments

A handwritten signature in blue ink, appearing to be 'N.S.', located below the list of practicals.

## Curriculum and Syllabi R-2020

### REFERENCE BOOKS:

1. SelvaRose. 1997, Career English for Nurses. Published by: Orient BlackswanLtd
2. Oxford advanced Learners Dictionary, 1996
3. Quirk Randolph and Greenbaum Sidney, 1987. A University Grammar of English, Hong Kong: Longman group (FE) Ltd/Pearson.
4. Thomson A.J. and MaituietA.V. 1987, A Practical English Grammar, Delhi: Oxford University Press.
5. Gimson A.C. 1989, An Introduction to pronunciation of English. Hodder Arnold; 4th Revised edition (1 May 1989).
6. O'Connor J.D, 1986. Better English pronunciation. Cambridge: University Press
7. By water F.V.A. 1982, Proficiency Course in English. London: 1- lodder and Stronglton.
8. Roget S.P. 1960, Thesaurus of English Words & Phrases, London: Lowe & Brydone Ltd. 1960.





**U20CTAT16**

**ENGLISH**

<b>L</b>	<b>P</b>	<b>Hrs</b>
<b>25</b>	<b>25</b>	<b>50</b>

**COMMUNICATION**

- Communication at the workplace
- Human needs and communication "Mind mapping" Information communication

**COMPREHENSION PASSAGE**

- Reading purposefully
- Understanding what is read
- Drawing conclusion
- Finding and analysis

**EXPLAINING**

- How to explain clearly
- Explaining procedures
- Giving directions

**WRITING BUSINESS LETTERS**

- How to construct correctly Formal language, Address, Salutation
- Body and Conclusion

**REPORT WRITING**

- Reporting an accident
- Reporting what happened at a session
- Reporting what happened at a meeting

**PRACTICAL**

- The clinical experience in the wards and bedside nursing will provide opportunity for students to fulfill the objectives of learning language
- Assignment on writing and conversation through participation in discussion debates seminars and symposia. The students will gain further skills in task oriented communication.



U20CTAT17

COMPUTER SCIENCE

L	P	Hrs
25	25	50

### TYPING TEXT IN MS WORD

- Inserting tables in a document.
- Formatting the text—using different font sizes, bold, italics
- Bullets and numbering
- Pictures, file insertion
- Aligning the text and justifies
- Choosing paper size
- Adjusting margins
- Header and footer, Inserting page No's in a document Printing a file with options
- Using spell check and grammar

### CREATING TABLE IN MS EXCEL

- Cell editing—Using formulas and functions Manipulating data with excel
- Using sort function to sort numbers and alphabets
- Drawing graphs and charts using data in Excel—Auto formatting—Inserting data from other work sheets.

### PREPARING NEW SLIDES USING MS POWERPOINT

- Inserting slides – Slide transition and animation – Using templates
- Different text and font sizes – Slides with sounds – Inserting clipart, pictures, tables and graphs– Presentation using wizards

### INTRODUCTION TO INTERNET

Using search engine –Google search—Exploring the next using Internet Explorer and Navigator – Uploading and Download of files and images – Email ID creation

- Sending messages – Attaching files in E-mailID
- Typing a text and aligning the text with different formats using MS-Word
- Inserting a table with proper alignment and using MS-Word
- Create emailmergedocument using MS-wordtopreparegreetingsfor10 friends
- Preparing a Slides how with transition, animation and sound effect using MS-PowerPoint
- Customizing the slides how and inserting pictures and tables in the slides using MS-PowerPoint
- Creating a work sheet using MS-Excel with data and use of functions
- Using MS-Excel prepare a worksheet with text, date time and data
- Preparing a chart and pie diagrams using MS-Excel

Using Internet for searching, uploading files, downloading files and creating E-mailID

Curriculum and Syllabi R-2020

**REFERENCE BOOKS:**

1. Fundamentals of computers- V.Rajaraman-2004
2. Absolute beginners guide to computer basics-Michael Miller. Que Publisher, September 1,2009.
3. Networking concepts and technology – by DeepakKalkadia, Francesco DiMambro, Prentice hall publisher, May 25,2007
4. Operation system concepts (8<sup>th</sup> edition) by AbrahamSilberschatz, Peter Baer Galvin, Greg Gangne, Wiley Publisher, Feb 13,2009.
5. Microsoft office 2013 for Dummies – by Wallace Wang, July 31,2013.



**SCHOOL OF ALLIED HEALTH SCIENCES**

**II-YEAR SYLLABUS**

**B. Sc. CARDIAC PERFUSION TECHNOLOGY**

<b>U20CPTT21</b>	<b>APPLIED PATHOLOGY &amp; APPLIED MICROBIOLOGY</b>	<b>L 60</b>	<b>P 40</b>	<b>Hrs 100</b>
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**APPLIED PATHOLOGY**

**CARDIOVASCULAR SYSTEM**

- Atherosclerosis- Definition, risk factors, briefly Pathogenesis & morphology, clinical significance and prevention.
- Hypertension- Definition, types and briefly Pathogenesis and effects of Hypertension.
- Aneurysms –Definition, classification, Pathology and complications.
- Pathophysiology of Heart failure.
- Cardiac hypertrophy – causes, Pathophysiology & Progression to Heart Failure.
- Ischaemic heart diseases- Definition, Types. Briefly Pathophysiology, Pathology & Complications of various types of IHD.
- Valvular Heart diseases- causes, Pathology & complication. Complications of artificial valves.
- Cardiomyopathy–Definition, Types, causes and significance.
- Pericardial effusion- causes, effects and diagnosis.
- Congenital heart diseases – Basic defect and effects of important types of congenital heart diseases.

**HAEMATOLOGY**

- Anaemia – Definition, morphological types and diagnosis of anaemia. Brief concept about Haemolytic anaemia and polycythaemia.
- Leukocyte disorders- Briefly leukaemia, leukocytosis, agranulocytosis etc.,
- Bleeding disorders- Definition, classification, causes & effects of important types of bleeding disorders. Briefly various laboratory tests used to diagnose bleeding disorders.

**RESPIRATORY SYSTEM**

- Chronic obstructive airway diseases – Definition and types.
- Briefly causes, Pathology and complications of each type of COPD.





## Academic Syllabus (R-2020)

- Briefly concept about obstructive versus restrictive pulmonary disease.
- Pneumoconiosis- Definition, types, Pathology and effects in brief.
- Pulmonary congestion and edema.
- Pleural effusion – causes, effects and diagnosis.

## RENALSYSTEM

- Clinical manifestations of renal diseases. Briefly causes, mechanism, effects and laboratory diagnosis of ARF & CRS. Briefly Glomerulonephritis and Pyelonephritis.
- End stage renal disease – Definition, causes, effects and role of dialysis and renal transplantation in its management.
- Brief concept about obstructive uropathy.

## PRACTICALS

- Description & diagnosis of the following gross specimens.
  - Atherosclerosis.
  - Aortic aneurysm.
  - Myocardial infraction.
  - Emphysema
  - Chronicglomerulonephritis.
  - Chronicpyelonephritis.
- Interpretation & diagnosis of the followingcharts.
  - a. hematologyChart -AML,CML,Hemophilia,neutrophilia, eosinophilia.
  - b. UrineChart - ARF, CRF, Acuteglomerulonephritis.
- Estimation of Hemoglobin.
- Estimation Bleeding & Clottingtime.

## REFERENCE BOOKS:

1. NayakRamadas,“Textbook Of Pathology For Allied Health Sciences” ,Jaypee Brothers 1<sup>st</sup> Edition.
2. Nanda Maheshwari, “Clinical Pathology/Hematology and Blood Banking” (For DMLT Students), Jaypee Brothers, 3<sup>rd</sup> Edition.
3. Dacie&Lewis, “Practical Hematology”, Elsevier Health – Uk, 11thEdition.
4. Lippincotts Illustrated Reviews in Pathology.



## APPLIED MICROBIOLOGY

### HEALTH CARE ASSOCIATED INFECTIONS AND ANTIMICROBIAL RESISTANCE:

Infections that patients acquire during the course of receiving treatment for other conditions within a healthcare setting like Methicillin Resistant Staphylococcus aureus infections, Infections caused by Clostridium difficile, Vancomycin resistant enterococci etc. Catheter related blood stream infections, Ventilator associated pneumonia, Catheter Related urinary tract infections, Surveillance of emerging resistance and changing flora. The impact and cost attributed to Hospital Associatedinfection

### DISEASE COMMUNICABLE TO HEALTHCARE WORKERS IN HOSPITAL SET UP AND ITS PREVENTIVE MEASURE:

Occupationally acquired infections in healthcare professionals by respiratory route ( tuberculosis, varicella-zoster, respiratory syncytial virus etc ), blood borne transmission ( HIV, Hepatitis B, Hepatitis C, Cytomegalovirus, Ebola virus etc), oro faecal route ( Salmonella, Hepatitis A etc), direct contact ( Herpes Simplex Virus etc). Preventive measures to combat the spread of these infections by monitoring and control.

### MICROBIOLOGICAL SURVEILLANCE AND SAMPLING:

Required to determine the frequency of potential bacterial pathogens including Streptococcus pneumoniae, Haemophilus influenzae, and Moraxella catarrhalis and also to assess the antimicrobial resistance. Sampling: rinse technique, direct surface agar plating technique.

### IMPORTANCE OFSTERILIZATION:

- Disinfection of instruments used in patient care: Classification, different methods, advantages and disadvantages of the variousmethods.
- Disinfection of the patient careunit
- Infection control measuresfor ICU's

### STERILIZATION:

- **Rooms:** Gaseous sterilization, one atmosphere uniform glow discharge plasma (OAUGDP).
- **quipments:** Classification of the instruments and appropriate methods of sterilization.
- **Central supply department:** The four areas and the floor plan for instrument cleaning, high-level disinfecting andsterilizingareas.

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### PREPARATION OF MATERIALS FOR AUTOCLAVING:

Packing of different types of materials, loading, holding time andunloading.

### PRACTICALS:

1. Principles of autoclaving & quality control ofSterilization.
2. Collection of specimen from outpatient units, inpatient units, minor operation theater and major operation theater for sterilitytesting.
3. The various methods employed for sterilitytesting.
4. Interpretation of results of sterilitytesting.
5. Disinfection of wards, OT and Laboratory.

Academic Syllabus (R-2020)

**REFERENCE BOOKS:**

1. Richard A Harvey, "Lippincotts Illustrated Reviews In Microbiology", Lippincotts Williams & Wilkins, 3<sup>rd</sup> Edition.
2. Thao Doan, "Lippincotts Illustrated Reviews Immunology", Lippincotts Williams & Wilkins, 2<sup>nd</sup> Edition.
3. ApurbaSastry, "Textbook Of Essentials Of Practical Microbiology", Jaypee Brothers,
4. 1<sup>st</sup> Edition.
5. Baveja, "Textbook Of Practical Microbiology, Arya Publications", 4<sup>th</sup> Edition.
6. JayaramPanikar, " Textbook Of Microbiology", Orient Black swan Pvt Limited, 9<sup>th</sup> Edition.
7. Baveja, "Textbook Of Microbiology", Arya Publications, 6<sup>th</sup> Edition.
8. Baveja, "Textbook Of Parasitology" , Arya Publications, 4<sup>th</sup> Edition



<b>U20CPTT22</b>	<b>INTRODUCTION TO PERFUSION TECHNOLOGY</b>	<b>L</b>	<b>P</b>	<b>Hrs</b>
		<b>60</b>	<b>40</b>	<b>100</b>

**BASICS OF DIAGNOSTIC TECHNIQUES:**

- Chest of X-ray ECG
- Echo Angiography
- Nuclear Cardiology
- Laboratory investigations in relation to perfusion technology
- Cardiopulmonary bypass and perfusion technology
- History of Cardiac surgery and perfusion
- Specific reference of Gibbon Lillehei, carrel
- Pre CPBsurgery
- Azygous Flowprinciple.
- Hypothermic/nonhypothermic non-CPB surgery including gross's Well technique and controlled crosscirculation.

**MONITORING AND INSTRUMENTATION**

- Concepts of monitoring – instrumentation technology of ECG machine, pressure transducer, syringe and peristaltic pumps, monitors, ventilators, pulse oximeters, temperature probesand thermo regulatory monitoring, defibrillators and fibrillators. Piped and non-piped gas delivery systems and connections. Basic physics related to medically usedgases.
- Haemodynamicmonitoring
- Haemostaticmonitoring
- Haemotologicmonitoring
- Maintenance of oxygen, carbon dioxide and acid-base status and theirmonitoring
- Neurological monitoring (SSPE, EEG and cerebral function monitor)
- Aseptictchnique.
- Cardiac surgery team, profession and terminology, scope of perfusientechnology

**PHYSIOLOGY OF EXTRACORPOREAL CIRCULATION**

**Heart – Lung machine**

- Principles of extracorporealcirculation
- Materials used in ECcircuit
- Principles of extracorporeal gasexchange

**Various types of oxygenators**

- Bubbleoxygenators
- Rotating spiral/cylinder/discoxygenators
- Membraneoxygenators





## Academic Syllabus (R-2020)

- Mechanism of action components defoaming, rated flow.

### **Theory of blood pumps**

- Ideal blood pump, pulsatile versus non-pulsatile flow, occlusive and non-occlusive pumps, various types of pumps roller, bellow, sigmoid motor, diaphragm, ventricular and centrifugal pumps.

### **Element of extracorporeal circulation/hazards of:**

- blood failure
- Bubble trap
- Flowmeters
- Temperatures
- Heat exchanger
- Regulating devices

### **Connection of the vascular system with extracorporeal circulation:**

- Arterial and venous cannulae.
- Connecting tubes and connectors
- Vents
- Suckers
- Cardioplegia delivery system
- Venous drainage.

Haemodynamic of arterial return, venous drainage, cardioplegia Delivery and venting.

Blood banking, handling of blood products and their management. Blood components and their use.

### **REFERENCE BOOKS:**

1. Cardiopulmonary Bypass Principles and Practice 3<sup>rd</sup> edition – Glenn P. Gravlee, M.D, (Editor) Richard F. Davis MD (Editor), Alfred H. Stammers MSA CCP (Editor)
2. Techniques in Extracorporeal Circulation 4<sup>th</sup> Edition – Philip H. Kay MA DM FRCS and Christopher M Munsch chM FRCS (Editors)
3. Cardio pulmonary Bypass Neonates, Richard A. Jonas (Editor) Publisher : CRC Press
4. Cardiac assist devices Daniel Goldstein (editor), Mehmet Oz (editor) publisher: Wiley Blackwell



<b>U20CPTT23</b>	<b>MEDICINE RELEVANT TO PERFUSION TECHNOLOGY</b>	<b>L</b>	<b>P</b>	<b>Hrs</b>
		<b>30</b>	<b>-</b>	<b>30</b>

**CARDIOVASCULAR SYSTEM**

- Ischemic heart diseases,
- Rheumatic heart disease
- Congenital heart disease
- Hypertension
- Aortic Aneurysms
- Cardiomyopathy
- Peripheral vascular disease
- Pulmonary edema and LV failure

**HEMATOLOGY**

- Anaemia
- Bleeding disorders
- Laboratory tests used to diagnose bleeding disorders (in brief)

**RESPIRATORY SYSTEM**

- Chronic obstructive airway diseases (COPD)
- Concept of obstructive versus restrictive pulmonary disease PFT and its interpretation

**RENAL SYSTEM**

- ARF & CRF
- End stage renal disease
- Role of dialysis and renal transplantation in its management

**CNS**

- Autonomic nervous system
- (Sympathetic & Parasympathetic system)
- Brief mention of CNS disorders & their etiology

**OTHERS**

- DM – Diabetes Mellitus
- Obesity
- Pregnancy
- Paediatric Patient (neonate/Infant) Elderly patient



Academic Syllabus (R-2020)

**REFERENCE BOOKS:**

1. Nanda Maheshwari, "Clinical Pathology/Hematology and Blood Banking"  
Jaypee Brothers, 3<sup>rd</sup> Edition.
2. Nayak Ramadas, "Histopathology Techniques & Its Management", Jaypee Brothers,  
1<sup>st</sup> Edition.
3. Techniques in Extracorporeal Circulation 4<sup>th</sup> Edition – Philip H. Kay MA DM FRCS and Christopher  
M Munsch chM FRCS (Editors)
4. Cardio Pulmonary Bypass Cambridge University – Sunit Ghosh, Florian Falter, Davis j. Cook  
(Editors)
5. Perfusion for Congenital Heart surgery notes on cardiopulmonary Bypass for a complex patient  
population – Gregory Matte CCP, LP, FPP(editor)



U20CTAT21

PHARMACOLOGY

L	P	Hrs
20	-	20

**INTRODUCTION**

Routes of administration, Pharmacokinetics, Pharmacodynamics, Drugs acting on Autonomic nervous system. Parasympathetic agents and blocking agents. Sympathetic agents and blocking agents Autocoids and respiratory system

- Non-steroidal anti-inflammatory drugs.
- Drugs for cough and bronchial asthma
- Respiratory stimulants and antihistamines Drugs acting on CNS
- Sedatives and hypnotics and alcohol
- General anaesthetics
- Anti-epileptics and Opioids

**DRUGS ACTING ON PNS**

- Smooth muscle relaxants
- Local anaesthetics Drugs acting on CVS
- Drugs for congestive cardiac failure
- Anti-hypertensive drugs
- Anti-arrhythmic drugs
- Anti-anginal drugs and diuretics
- Drugs used in treatment of shock Drugs acting on blood
- Anti-thrombotic drugs
- Anti-coagulants
- Fibrinolytic drugs
- Lipid lowering drugs
- Antimicrobial drugs Drugs acting on GIT

**DRUGS USED FOR ENDOCRINE DISORDERS**

- Insulin, oral hypoglycemic drugs Corticosteroids
- Thyroxine and anti-thyroid drugs

General concepts and resistance. Antibacterial drugs Antiviral drugs Anti-fungal drugs .Antiseptics and disinfectants Management of poisoned patients

**REFERENCE BOOKS:**

1. Lippincott's Illustrated Review's in Pharmacology -Seventh edition
2. Medical Pharmacology by Padmaja Uday Kumar- Seventh edition
3. Pharmacology for medical graduates by Tara Shanbhag – Fourth edition





	L	P	Hrs
<b>U20CTAT22</b>			
<b>ENVIRONMENTAL SCIENCE &amp; COMMUNITY MEDICINE</b>	<b>30</b>	<b>-</b>	<b>30</b>

**ENVIRONMENTAL SCIENCE (15 hrs)**

1. Introduction to environment
2. Sources, health hazards and control of environmental pollution
3. Water
4. The concept of safe and wholesome water
5. The requirements of sanitary sources of water
6. Understanding the methods of purifications of water on small scale and large scale various biological standards, including WHO guidelines for third world countries
7. Concept and methods for assessing quality of water.
8. Domestic refuse, sillage, human excreta and sewage their effects on environment and health, methods and issue related to their disposal.
9. Awareness of standards of housing and the effect of poor housing on health.
10. Role of arthropods in the causation of diseases, mode of transmission of arthropods borne diseases, methods of control

**REFERENCE BOOKS:**

1. Text book of Environmental studies for Under Graduate courses by ErachBarucha

**COMMUNITY MEDICINE (15 hrs)**

1. Epidemiology and Epidemiological Methods AIM / Approach /Rates/
2. Mortality / Morbidity and Disease transmission
3. Epidemiology of Communicable diseases
4. Epidemiology of Non-communicable diseases
5. Bio-medical waste Management
6. Disaster Management
7. Information, Communication and Health Education.
8. Screening for disease
9. History of Public Health
10. Organization of Health services
11. Health Care Delivery system

**REFERENCE BOOKS:**

1. Park's text book of Preventive and social Medicine – 23<sup>rd</sup> Edition(2015)
2. Community Medicine with recent advances by A.H. SuryaKantha
3. Short text book of preventive and social medicine by G.N.Prabhakar
4. Text book of community medicine – By Sunderlal.



**SCHOOL OF ALLIED HEALTH SCIENCES**

**III-YEAR SYLLABUS**

**B.Sc. CARDIAC PERFUSION TECHNOLOGY**

		<b>L</b>	<b>P</b>	<b>Hrs</b>
<b>U20CPTT31</b>	<b>PERFUSION TECHNOLOGY-CLINICAL</b>	<b>60</b>	<b>40</b>	<b>100</b>

- Pharmacokinetics and Pharmacodynamics of Cardiopulmonary bypass
- Drugs(including anesthetic drugs)used in cardiopulmonary bypass
- Conduct and monitoring of Cardio pulmonary bypass
- Adequacy of perfusion – General considerations, specific aspects of perfusion, monitoring, other concomitants which may affect its adequacy
- Pulsatile perfusion – Introduction, theory & physiology of pulsatile flow, hemodynamic, metabolic effects, Clinical use, hematological effects
- Cannulation techniques during cardaio pulmonary bypass
- Termination of cardiopulmonary bypass – principles and methodology
- Myocardial protection and cardioplegia- pretreatment of the Myocardium, cardioplegia, hypothermia, controlled reperfusion, myocardial protection for specific clinical problems, Complications of cardioplegia. Non cardioplegic methods during cardiac surgery on cardiopulmonary bypass
- Oxygenation – general consideration, bubble & membrane (including assessment and comparison of oxygenator function)
- Heat exchangers-principles function of heat exchangers & their assessment. Complications related to heat exchange and their management
- Priming fluids and hemodilution



Academic Syllabus (R-2020)

**REFERENCE BOOKS:**

1. Techniques in Extracorporeal Circulation 4<sup>th</sup> Edition – Philip H. Kay MA DM FRCS and Christopher M Munsch chM FRCS (Editors)
2. ECMO , Extracorporaeal cardiopulmonary support in critical care, Red BOOK , Gail M. Annich (author) Publisher : Extracorporeal life Support Organization .
3. Cardio pulmonary Bypass Neonates , Richard A. Jonas (Editor )Publisher : CRC Pres
4. Cardiac Assist devices Daniel Goldstein (editor), Mehmet Oz (editor) publisher: wiley Black well
5. Drugs for the heart : Expert consult – online and Print 8e paperback , Lionel H. Opie MD Dphi L Dsc FRCP (Author) , Bernard J. Gersh Mb ChB Dphi FACC ( Author) Bernard J. Gersh Mb ChB Dphi FACC (Author) publisher.



		<b>L</b>	<b>P</b>	<b>Hrs</b>
<b>U20CPTT32</b>	<b>PERFUSION TECHNOLOGY-APPLIED</b>	<b>60</b>	<b>40</b>	<b>100</b>

- Blood cell trauma – analysis of forces of fluid motion, effects of physical forces on blood cell, clinical effect. Complications of blood transfusion.
- Anticoagulation on bypass, its monitoring, its reversal and complications. Heparin less bypass. Platelet aggregation and platelet dysfunction. Coagulopathies due to cardiopulmonary bypass and its management.
- Inflammatory response to cardiopulmonary bypass & its clinical effects. Methods to minimise the same. Immune response, neuroendocrine, renal, metabolic splanchnic response, pulmonary response and electrolyte response to cardiopulmonary bypass
- Blood conservation hemofiltration & dialysis during cardiopulmonary bypass including modified ultra filtration reverse autologous priming and other methods
- Micro emboli- gaseous and particulate, filters used in cardiopulmonary bypass circuit.
- Micro pore filtration during cardiopulmonary bypass
- Counter pulsation techniques and assist devices

**REFERENCE BOOKS:**

1. Cardiopulmonary Bypass Principles and Practice 3<sup>rd</sup> edition – Glenn P. Gravlee, M.D, (Editor) Richard F. Davis MD (Editor), Alfred H. Stammers MSA CCP (Editor)
2. Techniques in Extracorporeal Circulation 4<sup>th</sup> Edition – Philip H. Kay MA DM FRCS and Christopher M Munsch chM FRCS (Editors)
3. Cardio Pulmonary Bypass Cambridge University – Sunit Ghosh, Florian Falter, Davis j. Cook (Editors)





Academic Syllabus (R-2020)

	L	P	Hrs
<b>U20CPTT33</b>			
<b>PERFUSION TECHNOLOGY-ADVANCED</b>			
	<b>60</b>	<b>40</b>	<b>100</b>

- Perfusion techniques for Pediatric cardiac surgery
- ECMO- special perfusion techniques for special cardiac surgeries and medical conditions(including thoracic aortic surgeries deep hypothermia and circulatory arrest). Perfusion for non cardiac surgery, invasive cardiology and outside the operation suite.
- Perfusion as a method of cardiopulmonary bypass
- Complications and safety during cardiopulmonary bypass – bypass safety, organizational aspects, accidents, coagulopathies, mechanical and electrical failures, perfusion management, perfusion systems, safety for the perfusionist and surgical team management of perfusion accidents.
- Minimally invasive surgery and the perfusionist
- Recent advances in perfusion techniques
- Experimental perfusion

**REFERENCE BOOKS:**

1. Cardiopulmonary Bypass Principles and Practice 3<sup>rd</sup> edition –Glenn P. Gravlee, M.D, (Editor) Richard F. Davis MD (Editor , Alfred H. Stammers MSA CCP (Editor)
2. ECMO , Extracorporaeal cardiopulmonary support in critical care , Red BOOK , Gail M. Annich (author) Publisher : Extracorporeal life Support Organization .
3. Cardio pulmonary Bypass Neonates , Richard A. Jonas (Editor )Publisher : CRC Pres
4. Cardiac Assist devices Daniel Goldstein (editor), Mehmet Oz (editor) publisher: wiley Black well
5. Drugs for the heart : Expert consult – online and Print 8e paperback , Lionel H. Opie MD Dphi L Dsc FRCP (Author) , Bernard J. Gersh Mb ChB Dphi FACC ( Author) Bernard J. Gersh Mb ChB Dphi FACC (Author) publisher



U20CTAT31

**BIostatistics AND ETHICS**

L	P	Hrs
30	-	30

**BIostatistics (15Hrs)**

- Introduction to Statistics
- Scales of Measurement
- Collection and Presentation of data
- Measures of Central tendency
- Measures of Variation
- Probability
- Binomial and Normal distribution
- Sampling Methods
- Sample size determination
- Correlation and Regression
- Statistical Significance
- Non-Parametric tests
- Health Statistics including hospital statistics

**REFERENCE BOOKS:**

- 1) KR Sundaram, SN Dwivedi and V Sreenivas (2010): Medical Statistics, Principles and Methods, BI Publications Pvt Ltd, New Delhi, India.
- 2) A Indrayan (2008): Basic Methods of Medical Research, Second edition, AITBS Publishers, India.
- 3) NSN Rao and NS Murthy (2008): Applied Statistics in Health Sciences, First Edition, JAYPEE brothers medical publishers (P) Ltd, India.

**MEDICAL ETHICS (15Hrs)**

1. Medical ethics - Definition - Goal - Scope
2. Code of conduct - Introduction - Basic principles of medical ethics - Confidentiality
3. Malpractice and negligence
4. Rational and irrational drug therapy
5. Autonomy and informed consent Rights of patients
6. Care of the terminally ill - Euthanasia
8. Organ transplantation
9. Medico legal aspects of medical records - Medical legal case and type - Records and document related to MLC - ownership of medical records - Confidentiality Privilege communication - Release of medical information - Unauthorized disclosure - retention of medical records - other various aspects.



Academic Syllabus (R-2020)