



# NPTEL Programme for Biological and Health Sciences

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3.	Dr. Bikash Medhi Professor, Department of Pharmacology Postgraduate Institute of Medical Education and Research Chandigarh, India Email: <a href="mailto:drbikashmedhi@gmail.com">drbikashmedhi@gmail.com</a>	Dr. Jagat Ram Prof. & Director Postgraduate Institute of Medical Education and Research Chandigarh, India Email:	



## NPTEL-MEDICAL RECORDING



4.	Col. Prafull Mohan Associate Prof, Dept. Of Pharmacology AFMC Pune – 40 Email: <a href="mailto:prafullcato74@gmail.com">prafullcato74@gmail.com</a>	Air Marshal C. K. Ranjan Director and Commandant Armed Forces Medical College Pune – 40 Email:	
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### 1.6. NPTEL-MEDICAL SCIENCE EXPERTS (PHYSIOLOGY)

S.no	Teacher	Dean/Principal	Remarks
1.	Dr. Sathya Subramani Professor Dept. Of Physiology, Christian Medical College Vellore – 632 002 Email: <a href="mailto:sathya@cmcvellore.ac.in">sathya@cmcvellore.ac.in</a>	Dr. Anna. B. Pulimood Principal, Christian Medical College, Vellore – 632 002 Email: <a href="mailto:princi@cmcvellore.ac.in">princi@cmcvellore.ac.in</a>	National Coordinator, NPTEL (Physiology- Health sciences)
2.	Dr. Vinay Timothy Oommen Professor Dept. Of Physiology Christian Medical College Vellore – 632 002 Email: <a href="mailto:vinayoommen@cmcvellore.ac.in">vinayoommen@cmcvellore.ac.in</a>	Dr. Anna. B. Pulimood Principal, Christian Medical College, Vellore – 632 002 Email: <a href="mailto:princi@cmcvellore.ac.in">princi@cmcvellore.ac.in</a>	
3.	Dr. Anand Bhaskar Professor Dept. Of Physiology Christian Medical College Vellore – 632 002 Email: <a href="mailto:anandbhaskar@cmcvellore.ac.in">anandbhaskar@cmcvellore.ac.in</a>	Dr. Anna. B. Pulimood Principal Christian Medical College Vellore – 632 002 Email: <a href="mailto:princi@cmcvellore.ac.in">princi@cmcvellore.ac.in</a>	
4.	Dr. Vivek Kumar Sharma DEAN & Professor & Head, Department of Physiology, Government Institute of Medical Sciences, King George Medical University Greater NOIDA, Uttar Pradesh, INDIA-201310 Ph – (+91) 9442529673 8668117030		



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6.	Dr. Jayasree Sen Gupta Retd Professor, Dept of Physiology All India Institute of Medical Sciences New Delhi <a href="mailto:jsen47@gmail.com">jsen47@gmail.com</a>		
7.	Dr.Gnanasenthil. G Assistant Professor, Department of Physiology, KAPV Government Medical College, Tiruchirapalli 2013 – 2018 <a href="mailto:gnanasenthil654321@gmail.com">gnanasenthil654321@gmail.com</a>	Prof. Dr.S.Saradha M.S.,(G.S) KAPV Government Medical College, Periyamilaguparai, Colletor's office Road, Trichy, Tamil Nadu - 620001 Ph : 0431 - 2401011 Email ID : <a href="mailto:kapvgmctry@yahoo.co.in">kapvgmctry@yahoo.co.in</a>	
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9.	Dr. Anandit Mathew Asst. Professor Dept. Of Physiology CMC, Vellore Email:	Dr. Anna. B. Pulimood Principal Christian Medical College Vellore – 632 002 Email: <a href="mailto:princi@cmcvellore.ac.in">princi@cmcvellore.ac.in</a>	
10.	Dr. Padmavathy Ramasamy Professor, Dept of Physiology SRI RAMACHANDRA INSTITUTE OF HIGHER EDUCATION AND RESEARCH (Deemed to be University) Porur Chennai <a href="mailto:rpadmavathi@sriramachandra.edu.in">rpadmavathi@sriramachandra.edu.in</a>	Dr. P. V. Vijayaraghavan Vice Chancellor Sri Ramachandra University Porur, Chennai -600116 Email: <a href="mailto:vc@sriramachandra.edu.in">vc@sriramachandra.edu.in</a>	



## 2. PROPOSED COURSE DETAILS

### 2.1. ANATOMY

#### 2.1.1. UPPER LIMB

S.No	Region	Lecture	Teacher	Duration
1.	Upper Limb	Brachial Plexus	Dr. T. Vijaya Sagar	60 min
2.		Shoulder Joint	Dr. Bertha Rethinam	60 min
3.		Radial nerve	Dr. Rema Devi	60 min
4.		Median nerve	Dr. Shubha Sudarshan	60 min
5.		Palmar Spaces	Dr. Daksha Dixit	60 min
6.		Mammary gland	Dr. Gaurav Agnihotri	60 min

#### 2.1.2. LOWER LIMB

7.	Lower Limb	Hip Joint	Dr. T. Vijaya Sagar	60 min
8.		Knee Joint	Dr. Bertha Rethinam	60 min
9.		Arches of Foot	Dr. Rema Devi	60 min
10.		Sciatic nerve	Dr. Shubha Sudarshan	60 min
11.		Venous Drainage of lower limb	Dr. Daksha Dixit	60 min

#### 2.1.3. THORAX

12.	Thorax	Gross anatomy of Heart	Dr. Gaurav Agnihotri	60 min
13.		Coronary circulation	Dr. T. Vijaya Sagar	60 min
14.		Pleura	Dr. Bertha Rethinam	60 min
15.		Lungs	Dr. Rema Devi	60 min
16.		Mediastinum	Dr. Shubha Sudarshan	60 min

#### 2.1.4. ABDOMEN

17.	Abdomen	Stomach	Dr. Daksha Dixit	60 min
18.		Liver	Dr. Gaurav Agnihotri	60 min
19.		Kidneys	Dr. T. Vijaya Sagar	60 min





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20.		Pancreas	Dr. Bertha Rethinam	60 min
21.		Extra-hepatic biliary apparatus	Dr. Rema Devi	60 min
22.		Appendix & Caecum	Dr. Shubha Sudarshan	60 min
23.		Inguinal canal	Dr. Daksha Dixit	60 min
24.		Portal vein	Dr. Gaurav Agnihotri	60 min
25.		Peritoneum	Dr. T. Vijaya Sagar	60 min
26.		Respiratory Diaphragm	Dr. Bertha Rethinam	60 min

#### 2.1.5. PELVIS PERINEUM

27.	Pelvis Perineum	Urinary Bladder	Dr. Rema Devi	60 min
28.		Prostate	Dr. Shubha Sudarshan	60 min
29.		Uterus	Dr. Daksha Dixit	60 min
30.		Ischio-rectal fossa	Dr. Gaurav Agnihotri	60 min

#### 2.1.6. HEAD NECK

31.	Head Neck	Scalp	Dr. T. Vijaya Sagar	60 min
32.		Orbit + extra ocular muscles	Dr. Bertha Rethinam	60 min
33.		Posterior triangle	Dr. Rema Devi	60 min
34.		Thyroid Gland	Dr. Shubha Sudarshan	60 min
35.		Parotid Gland	Dr. Daksha Dixit	60 min
36.		Submandibular gland	Dr. Gaurav Agnihotri	60 min
37.		Tongue	Dr. T. Vijaya Sagar	60 min
38.		Larynx	Dr. Bertha Rethinam	60 min
39.		Middle ear	Dr. Rema Devi	60 min
40.		Pharynx	Dr. Shubha Sudarshan	60 min
41.		Lateral wall of nose	Dr. Daksha Dixit	60 min
42.		Soft Palate	Dr. Gaurav Agnihotri	60 min
43.		Lymphatic drainage – Head Neck	Dr. T. Vijaya Sagar	60 min
44.		Blood supply – Head Neck	Dr. Bertha Rethinam	60 min
45.		Temperomandibular joint	Dr. Rema Devi	60 min
46.		Infratemporal fossa	Dr. Shubha Sudarshan	60 min
47.		Dural folds & venous sinuses	Dr. Daksha Dixit	60 min
48.		Anterior triangle	Dr. Gaurav Agnihotri	60 min
49.		Clinical Anatomy of Upper limb		( 6 hours)

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50.		Clinical Anatomy of Lower limb	(5 hours)
51.		Clinical Anatomy of Thorax	(5 hours)
52.		Clinical Anatomy of Abdomen and Pelvis	(14 hours)
53.		Clinical Anatomy of Head and Neck	(18 hours)

## 2.2. BIOCHEMISTRY

### 2.2.1. BLOCK 1 - ENZYMES - (7 hrs.)

BLOCK 1- ENZYMES ( 7 hrs)			
Sl No.	Topic	Faculty Name	Time
1.	Active site	Dr. Pragna Rao	30 mins
2.	Mechanism of enzyme action	Dr. Pragna Rao	30 mins
3.	Applications & importance of factors affecting enzyme action	Dr. Krishnananda Prabhu	30 mins
4.	Coenzymes and cofactors	Dr. Krishnananda Prabhu	30 mins
5.	Enzyme regulation	Dr. Poornima Manjrekar	1 hour
6.	Types of Enzymes	Dr. Ullas Kamath	30 mins
7.	Zymogens	Dr. Ullas Kamath	30 mins
8.	Iso enzymes	Dr. Rukmini. M. S.	30 mins
9.	Metalloenzymes	Dr. Rukmini. M. S.	30 mins
10.	Role of enzymes in IEM	Dr. Anupama Hegde	30 mins
11.	Epigenetics	Dr. Anupama Hegde	30 mins
12.	Post translational modifications	Dr. Chandrika. D. Nayak	30 mins
13.	Clinical applications of enzyme inhibition	Dr. Chandrika. D. Nayak	30 mins

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## 2.2.2. BLOCK 2 - AMINOACIDS - (7 hrs.)

BLOCK 2- AMINOACIDS ( 7 hrs. )			
1.	Understanding structural organization of proteins as a basis for understanding its function (emphasis on Hb and collagen)	Dr. Ravindra Maradi	30 mins
2.	Plasma proteins in health and disease (emphasis on structure of immunoglobulins)	Dr. Poornima Manjrekar	1hour
3.	Digestion and absorption of proteins with associated disorders	Dr. Anupama Hegde	1 hour
4.	Sources of ammonia, detoxification and associated disorders	Dr. Ravindra Maradi	1 hour 30mins
5.	Overview of metabolism of the following amino acids and its application in understanding the associated inborn errors of metabolism and buildup of secondary metabolites i) Glycine ii) Sulphur containing aminoacids iii) Aromatic aminoacids iv) Branched chain aminoacids	Dr. Ravindra Maradi Dr. Ravindra Maradi Dr. Rukmini. M. S. Dr. Rukmini. M. S.	30 mins 30 mins 1 hour 30mins
6.	Overview of neurotransmitter metabolism with emphasis on Myasthenia gravis and Parkinson's disease	Dr. Rukmini. M. S.	30mins



## 2.2.3. BLOCK 3 - HEME METABOLISM; ROLE OF LIVER - (6 hrs.)

BLOCK 3- HEME METABOLISM; ROLE OF LIVER - 6 hrs.			
1.	A. Heme containing compounds & structure of heme, b. Understanding the reactions of heme synthesis to relate it with the biochemical basis of lead poisoning and findings in porphyria cutanea tarda and acute intermittent porphyria	Dr. Krishnananda Prabhu	1 hour 30mins
2.	Application of structural knowledge of normal hemoglobin in understanding the genetics and pathogenesis of major hemoglobinopathies (emphasis on sickle cell anemia and thalassemias)	Dr. Krishnananda Prabhu	30mins
3.	Catabolism of heme and metabolism of bilirubin (its types, transport in blood, uptake, conjugation and secretion by liver, formation and fate of urobilinogen)	Dr. Ullas Kamath/ Dr. Chandrika Nayak	1 hour
4.	Jaundice: a. Introduction, classification and causes for each type, emphasis on physiologic jaundice B. Biochemical basis for findings and role of laboratory investigations in differential diagnosis	Dr. Ullas Kamath/ Dr. Chandrika Nayak	30mins
		Dr. Ullas Kamath/ Dr. Chandrika Nayak	1 hour
5.	Role of liver in biotransformation/detoxification (types and examples)	Dr. Ullas Kamath/ Dr. Chandrika Nayak	30 mins
6.	Alcohol metabolism, biochemical basis for consequences of alcohol intoxication	Dr. Ullas Kamath/ Dr. Chandrika Nayak	1hour



## 2.2.4. BLOCK 4 - CARBOHYDRATES - (8 hrs.)

BLOCK 4 - CARBOHYDRATES ( 8 hrs. )			
1.	Polysaccharides structure & function	Dr. Minnie Faith	30 mins
2.	Dietary carbohydrates	Dr. Minnie Faith	30 mins
3.	Absorption –enzymes involved, glycemic index & factors affecting absorption.	Dr. Krishnananda Prabhu	30 mins
4.	Glucose transporters & disorders	Dr. Krishnananda Prabhu	30 mins
5.	Normal structure , function of insulin & role of gene regulation	Dr. Minnie Faith	30 mins
6.	Major metabolic pathways of glucose	Dr. Minnie Faith	1 hour
7.	Insulin receptors & Insulin resistance	Dr. Poornima Manjrekar	1 hour
8.	Regulation of blood glucose Fate of absorbed glucose, preferential use of glucose in normal and abnormal conditions (gluconeogenesis)	Dr. Ravindra Maradi	1 hour
9.	Inter conversion of CHO- glucose- galactose- fructose	Dr. Minnie Faith	30 mins
10.	Disorders of carbohydrates metabolism excluding DM	Dr. Minnie Faith	30 mins
11.	Bio chemistry of DM and complications (including classification in brief )	Dr. Pragna Rao	1 hour
12.	Screening, Diagnosis & Monitoring of DM Newer markers	Dr. Anupama Hegde	1 hour



## 2.2.5. BLOCK 5 - LIPIDS - (12 hrs.)

BLOCK 5 – LIPIDS ( 12 hrs. )			
1.	Chemistry of dietary lipids (saturated, unsaturated, pufas, fortified oils)	Dr. Pragna Rao	1 hour
2.	Phospholipids & Glycolipids	Dr. Pragna Rao	30 mins
3.	Lipoprotein structure, Chemistry, functions	Dr. Ullas Kamath	30 mins
4.	LDL receptors & metabolism (briefly Lp(a))	Dr. Anupama Hegde	30 mins
5.	Biochemistry of atherosclerosis	Dr. Pragna Rao	30 mins
6.	Role of mitochondria in lipid metabolism (carnitine, $\beta$ oxidation)	Dr. Anupama Hegde	30 mins
7.	Cholesterol important aspects structure and its biochemical functions.	Dr. Chandrika Nayak	30 mins
8.	Extended lipid profile (Non HDL, apoA, apoB, LDL, Lp(a) fasting Vs non fasting)		1 hour
9.	NAFLD	Dr. Rukmini M. S.	30 mins
10.	Digestion & absorption (Lipases & inhibitors, re-esterification, importance of bile & its clinical significance)	Dr. Krishnananda Prabhu	30 mins
11.	Inborn errors of lipid metabolism (Lipid storage, lysosomal, oxidation disorders)		30 mins
12.	Biochemistry of lipid lowering agents-14.	Dr. Rukmini. M. S.	30 mins
13.	VLDL Fatty liver/ Lipotropic factors	Dr. Ullas Kamath	30 mins
14.	Conditions predisposing to KB formation and their significance –understanding ketosis	Dr. Chandrika Nayak	30 mins



15.	Cell membrane/ Asymmetry/ Lipid protein ratio / Liposomes/ Micelles	Dr. Minnie Faith	30 mins
16.	Role of HDL in metabolism of other lipoproteins	Dr. Chandrika Nayak	30 mins
17.	Sweets are fattening! Carbohydrates to Fat Link	Dr. Chandrika Nayak	30 mins
18.	Essential FA and their special compounds-Clinical significance	Dr. Minnie Faith	30 mins
19.	Prostaglandins- the double edged sword	Dr. Minnie Faith	30 mins
20.	Dysregulation of lipid metabolism in DM	Dr. Poornima Manjrekar	30 mins
21.	Adipose tissue metabolism	Dr. Poornima Manjrekar	30 mins
22.	Hyperlipoproteinemias		30 mins

## 2.3. MICROBIOLOGY

### 2.3.1. BLOCK - I INTRODUCTION & PRINCIPLES OF DIAGNOSIS OF INFECTIOUS DISEASES

- (4.5 HRS.)

Block-I Introduction & Principles of diagnosis of infectious diseases (4.5 hrs.)			
Sl.No	Blocks / Topics	Contents	Time
1	Introduction to the course	Role & Scope of Clinical Microbiology in practice	30 mins.
2	Introduction to pathogenic <b>Bacteria</b> and their Laboratory Diagnosis (Direct Methods)	Brief morphology of bacteria, Gram staining, General steps in their laboratory diagnosis including Microscopy & Culture	1 hr.
3	Diagnosis of Bacterial diseases, Molecular diagnosis. (Indirect Methods)	Basic Principles of Immunity, Antigen-Antibody reactions and serological reactions. PCR; types & role in diagnosis	1 hr.
4	Introduction to pathogenic <b>Viruses</b> and their Laboratory Diagnosis	Classification, and approach to their laboratory diagnosis (Direct & Indirect diagnosis)	1 hr.
5	Introduction to pathogenic <b>Fungi</b> and their Laboratory diagnosis	Classification, Enumeration of pathogenic fungi, morphology And laboratory diagnosis	30 mins.



6	Introduction to Medically important <b>Parasites</b> and their Laboratory Diagnosis	Classification, general morphology and approach to the laboratory diagnosis of parasitic Infections	30 mins.
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## 2.3.2. BLOCK - II SKIN &amp; SOFT TISSUE INFECTIONS - (4.5 HRS.)

Block-II Skin & Soft Tissue Infections ( 4.5 hrs.)			
7	<b>Superficial Infections</b> Boils, Carbuncle, Furuncle (Toxic Shock syndrome)	Work up of a case of Carbuncle including spectrum of soft tissue infections, list of possible causative agents, Differential diagnosis, laboratory diagnosis & management <b>Staphylococcus aureus:</b> Morphology, clinical manifestations, pathogenesis & laboratory diagnosis, epidemiology (including hospital epidemiology) & antimicrobial spectrum	1 hr.
8	Gas Gangrene & Anthrax	Workup of a case, causative organism, Pathogenesis, Laboratory Diagnosis & Management Malignant pustule : causative agent and its laboratory Diagnosis & Management	1 hr.
9	Ring worm Pityriasis versicolor and others	Work up of a case, Differential Diagnosis & laboratory diagnosis <b>Dermatophytes:</b> Classification, Morphology, Clinical manifestations, Pathogenesis & Laboratory Diagnosis <b>Malassezia furfur</b>	30 mins.
10	Candidiasis & Actinomycosis	Work up of a case, Clinical manifestations and laboratory diagnosis of Candidiasis and Actinomycosis	30 mins.
11	Subcutaneous Mycoses	Case history, Morphology, Clinical manifestations, pathogenesis & Laboratory Diagnosis of <b>Mycetoma, (Nocardia &amp; Sporothrix)</b>	30 mins.
12	Viral exanthematous conditions	Case history, Differential Diagnosis, Morphology, Clinical manifestations, pathogenesis & Laboratory Diagnosis of <b>Measles &amp; Rubella</b> In brief about: <b>Chicken Pox, Herpes Zoster, Warts (Molluscum contagiosum)</b>	1 hr.





## 2.3.3. BLOCK - III RESPIRATORY TRACT INFECTIONS - (6.5 HRS.)

Block-III Respiratory Tract Infections ( 6.5 hrs.)			
13	Upper Respiratory Tract infections (URTI)	Work up of a case of sore throat, list of causative agents. <b><i>Streptococcus pyogenes</i></b> : pathogenesis, laboratory diagnosis and antimicrobial spectrum	1 hr.
14	Diphtheria	Work up of a case, Clinical presentation, pathogenesis , Laboratory diagnosis, Prevention & management	30 mins.
15	Viral URTI	Enumerate the viruses. <b><i>Influenza Virus</i></b> : Morphology, Pathogenesis, laboratory diagnosis, Management, Epidemiology & prophylaxis. Brief overview of <b><i>Corona viruses, RSV &amp; Parainfluenza viruses</i></b>	1 hr.
16	Community acquired pneumonia	Case work up of a case of pneumonia, Differential diagnosis, disease burden and Causative agents. <b><i>Streptococcus pneumoniae</i></b> : pathogenesis, laboratory diagnosis, antimicrobial susceptibility, Vaccines available Role of <b>Non sporing anaerobes</b> in pulmonary infections and their laboratory diagnosis	1 hr.
17	Pneumonia (contd.) Whooping Cough	Brief overview of <b><i>Chlamydia and Mycoplasma &amp; Bordetella pertussis</i></b> infections: Case history followed by pathogenesis, sample collection, laboratory diagnosis & prophylaxis	1 hr.
18	Fungi causing Pulmonary Mycoses	Case history, list of causative agents, Pathogenesis and laboratory diagnosis of Histoplasmosis and Aspergillus spp	1 hr.
19	Tuberculosis	Case history followed by pathogenesis, laboratory diagnosis, Antimicrobials used for therapy & RNTCP program guidelines	1 hr.



## 2.3.4. BLOCK - IV GASTROINTESTINAL TRACT INFECTIONS - (6.5 HRS.)

Block-IV Gastrointestinal Tract Infections 6.5 hrs.			
20	Diarrhea	Case history, Causative agents of Diarrhea <b><i>E.coli</i></b> : Diarrhea genic <b><i>E.coli</i></b> Clinical manifestations, pathogenesis, Laboratory Diagnosis , Antimicrobials used & their role	1 hr.
21	Viral Diarrhea	Case history, Enumeration of Viruses causing diarrhea , laboratory diagnosis & prophylaxis	30 mins.
22	Intestinal Protozoa causing diarrhea	Clinical presentation, laboratory diagnosis of <b><i>Giardia</i></b> and <b><i>Sporozoa</i></b>	30 mins.
23	Cholera	Case report, Morphology, Classification, Clinical manifestations, pathogenesis & Laboratory Diagnosis of <b><i>V.cholera (mention campylobacter)</i></b>	1 hr.
24	Dysentery	Work up of a case, Causative agents of Dysentery <b><i>Shigella</i></b> : pathogenesis, Laboratory Diagnosis and antimicrobials used for therapy	30 mins.
25	Dysentery (Protozoal)	<b><i>E.histolytica</i></b> : Clinical manifestations, pathogenesis, Morphology, Life cycle & Laboratory Diagnosis.	1 hr.
26	Parasitic infestations: Intestinal Nematodes	Clinical Presentation, Morphology, Life cycle, Pathogenesis and laboratory diagnosis of <b><i>A.lumbricoides, A.duodenale, S.stercoralis, E.vermicularis.</i></b>	1 hr.
27	Parasitic infestations: Cestodes	Clinical presentation, Etiological agents, Morphology, Life cycle, Pathogenesis and laboratory diagnosis of <b><i>Taenia solium, Taenia saginata and Echinococcus granulosus.</i></b>	30 mins.
28	Food Poisoning	Clinical case, enumeration of etiological agents, Source, and Investigations of outbreaks of Food Poisoning. <b><i>(B.cereus, C.perfringens, S. Aureus, C.botulinum, V.parahemolyticus)</i></b>	30 mins.
Evaluation : mcqs			



## 2.3.5. BLOCK - V UROGENITAL INFECTIONS - (4.5 HRS.)

Block-V Urogenital Infections (4.5 Hrs.)			
29	Urinary Tract Infection	Work up of a case. Definition, Differential diagnosis and laboratory diagnosis of Urinary Tract Infection. Enterobacteriaceae & in brief about Uropathogenic <b>E.coli</b> , <b>Proteus</b> and <b>Klebsiella</b>	1 hr.
30	Urethritis - Gonorrhoea	Case history, Differential Diagnosis <b>N.gonorrhoeae</b> : Pathogenesis, Clinical features ,laboratory diagnosis and antimicrobials used for therapy	30 mins.
31	Non-Gonococcal Urethritis (NGU)	<i>Case history, Clinical features and laboratory diagnosis of T.vaginalis, G.vaginalis, C.trachomatis, M.hominis, U.urealyticum infections causing NGU</i>	30 mins.
32	Genital Ulcers	Work up of a case, Differential Diagnosis, Epidemiology, <b>T.pallidum</b> : Clinical features, Types, complications & laboratory diagnosis of <b>Syphilis</b> Brief Account on <b>H.ducreyi, Lymphogranuloma venereum, Granuloma inguinale</b>	1 hr.
33	Viral stds	Clinical case and its Differential Diagnosis. <b>Human Herpes Viruses &amp; HPV</b> Clinical presentation, Morphology, pathogenesis & Laboratory Diagnosis	30 mins.
34	Viral stds (contd.)	<b>HIV</b> : Clinical presentation, Morphology, pathogenesis & Laboratory Diagnosis	1 hr.

## 2.3.6. BLOCK - VI LIVER AND BILIARY SYSTEM - (1.5 HRS.)

Block-VI Liver and Biliary System (1.5 hrs.)			
35	Hepatitis (Acute)	Work up of a case of infective hepatitis, Brief Introduction, disease burden and Causative agents of Acute hepatitis Morphology, Classification, Clinical manifestations, pathogenesis & Laboratory Diagnosis of <b>Hepatitis A</b> and <b>Hepatitis E Viruses</b>	30 mins.
36	Hepatitis (Chronic)	Morphology, Classification, Clinical manifestations, pathogenesis & Laboratory Diagnosis of <b>Hepatitis B, C and D Viruses</b>	1 hr.
Evaluation : mcqs for Block V & VI			



2.3.7. BLOCK - VII CNS INFECTIONS - (5.5 HRS.)

Block-VII CNS Infections (5.5 hrs.)			
37	Meningitis	Clinical case, Differential Diagnosis, and laboratory diagnosis of Meningitis <b>N.meningitidis, H.influenzae</b> Pathogenesis and laboratory diagnosis. Aseptic meningitis : causative agents	1 hr.
38	Chronic meningitis	Case, Differential Diagnosis, laboratory diagnosis. Cryptococcal Meningitis & TB meningitis: Laboratory diagnosis and therapy.	30 mins.
39	Encephalitis	Work up of a case, disease burden, Clinical features and laboratory diagnosis of Encephalitis <b>Arboviruses</b> causing encephalitis : <b>Japanese encephalitis virus</b>	1 hr.
40	Acute Flaccid Paralysis	<b>Poliomyelitis</b> : Clinical presentation, laboratory Diagnosis , Epidemiology & Immunization	30 mins.
41	Brain abscess	Case presentation, : Differential Diagnosis, <b>Nonsporing anaerobes</b>	30 mins.
42	Parasites infecting the CNS	Clinical presentations, enumerate the pathogens and laboratory diagnosis. Primary amoebic meningoencephalitis: <b>Acanthamoeba, Naegleria</b>	1 hr.
43	Other bacterial CNS infections	<b>Clostridium tetani, Clostridium botulinum</b>	30 mins.
44	Other Viral CNS infections	Introduction, Pathogenesis and laboratory diagnosis of <b>Rabies</b>	30 mins.
<b>Evaluation : mcqs</b>			

2.3.8. BLOCK - VIII PYREXIA OF UNKNOWN ORIGIN - (4.0 HRS.)

Block-VIII Pyrexia of Unknown Origin (4.0 hrs.)			
45	PUO Typhoid and Paratyphoid fevers	Case of PUO, Definition, Differential Diagnosis, and Laboratory Diagnosis of PUO. Morphology, Pathogenesis, Clinical features and laboratory diagnosis of <b>S.typhi, &amp; S.paratyphi</b> infections	1 hr.
46	Brucellosis, Leptospirosis	Clinical features, Pathogenesis, Clinical features and laboratory diagnosis of <b>Brucellosis, Leptospirosis</b>	30 mins.



47	Rickettsial infections	Clinical features, Pathogenesis, Clinical features and laboratory diagnosis of <b><i>Rickettsial infections</i></b>	30 mins.
48	Viral fevers	Clinical features, list of causative agents , Disease burden, pathogenesis, Clinical features and Laboratory diagnosis of <b><i>Dengue</i></b> and <b><i>Chikungunya</i></b> virus infections	1 hr.
49	Malaria	Clinical features, disease burden, pathogenesis, Life cycle and Laboratory diagnosis of <b><i>Plasmodium</i></b> infections	30 mins.
50	Filariasis	Clinical features, disease burden, pathogenesis, Life cycle and Laboratory diagnosis of <b><i>W.bancrofti</i></b> In brief about <b>Trypanosomiasis</b>	30 mins.

## 2.3.9. BLOCK - IX HOSPITAL ACQUIRED INFECTIONS &amp; MISCELLANEOUS - (3.0 HRS.)

Block-IX Hospital Acquired infections & Miscellaneous (3.0 hrs.)			
51	Hospital Acquired Infections (HAI)	Definition, Etiological agents, Pathogenesis, Source tracing and laboratory diagnosis (with special reference to: <b><i>Pseudomonas and Acinetobacter</i></b> )	30 mins.
52	Prevention of HAI	Universal safety precautions, Care bundles in relation to VAP, SSI, CRBSI, UTI	1 hr.
53	Biomedical Waste its Management	Introduction, Waste categories, Waste treatment and Disposal	30 mins.
54	Immunoprophylaxis	Classification of Vaccines, Universal immunization schedule. Vaccines for international travel. Common complications of vaccines	1 hr.

Number of Classes of 1 Hr. Duration	27
Number of Classes of 30 mins duration	27
Total Hours	40.30



## 2.4. PATHOLOGY

### 2.4.1. CELLULAR RESPONSES TO INJURY

	<b>CELLULAR RESPONSES TO INJURY</b>	
1.1	What is Pathology?	Dr. Annamma Kurien/ Dr. K. Ramnarayan
1.2	Cellular Adaptation – Adapt to survive	
1.3	Differentiation and altered differentiation	
1.4	Necrosis	
1.5	Apoptosis	
1.6	Intracellular accumulations	

### 2.4.2. ACUTE & CHRONIC INFLAMMATION

	<b>ACUTE &amp; CHRONIC INFLAMMATION</b>	
2.1	Inflammation 1	Dr. Kanthilatha Pai/ Dr. K. Ramnarayan
2.2	Inflammation 2	
2.3	Inflammation 3	
2.4	Chemical mediators- Cell derived	
2.5	Chemical mediators- Plasma protein derived	
2.6	Patterns of acute inflammation,	
2.7	Granulomatous inflammation	

### 2.4.3. WOUND HEALING

	<b>WOUND HEALING</b>	
3.1	Cell cycle	Dr. Sharada Rai
3.2	Wound healing- Primary & Secondary	
3.3	Factors affecting wound healing & common complications	
3.4	Fracture healing	



## 2.4.4. CIRCULATORY DISTURBANCES

CIRCULATORY DISTURBANCES		
4.1	Edema	Dr. Hema Kini
4.2	Hyperemia & Congestion	
4.3	Embolism- I & II	
4.4	Infarction	
4.5	Shock	

## 2.4.5. GENETICS

GENETICS		
5.1	Prenatal diagnosis of genetic conditions	Dr. Girisha. K. M.
5.2	Genetic counselling & patterns of inheritance	
5.3	Genetic testing/Genetic basis of cancer & familial cancers/Approach to a dysmorphic child	

## 2.5. PHARMACOLOGY

Sl. No	Title	Expert
1	Drugs used in Asthma	Dr. Y. K. Gupta
2	Constipation	Dr. Y. K. Gupta
3	Diarrhea and constipation	Dr. Y. K. Gupta
4	Glaucoma	Dr. Y. K. Gupta
5	Myasthenia gravis	Dr. Y. K. Gupta
6	Emetics and anti-emetics	Dr. Y. K. Gupta
7	Drugs used in parkinsons disease	Dr. Y. K. Gupta
8	How Drug Act?	Dr. Y. K. Gupta
9	Drugs used in Peptic ulcer disease	Dr. Y. K. Gupta
	<b>Total Hours</b>	
10	Analgesics and anti-inflammatory agents	Dr. Santanu Kumar Tripathi
11	Bioavailability and Bioequivalence	Dr. Santanu Kumar Tripathi
12	Analgesics and anti-inflammatory agents_12-11-18	Dr. Santanu Kumar Tripathi
13	Uterotonics and Tocolytics	Dr. Santanu Kumar Tripathi



14	Uterotonics contd.	Dr. Santanu Kumar Tripathi
15	Antimuscarinic drugs	Dr. Santanu Kumar Tripathi
16	Drug abuse and drug dependence	Dr. Santanu Kumar Tripathi
17	Cancer Chemotherapy Principles and Practice	Dr. Santanu Kumar Tripathi
18	Analgesics and anti-inflammatory agents	Dr. Santanu Kumar Tripathi
	<b>Total Hours</b>	
19	Pharmacology of Beta Blockers	Dr. Bikash Medhi
20	Autocoids	Dr. Bikash Medhi
21	Local anesthetics	Dr. Bikash Medhi
22	Pharmacokinetics: Biotransformation and elimination	Dr. Bikash Medhi
23	Adrenaline and other sympathomimetics	Dr. Bikash Medhi
24	Contraceptive agents	Dr. Bikash Medhi
25	Pharmacotherapy in glaucoma	Dr. Bikash Medhi
26	Anti-Epileptic Drugs	Dr. Bikash Medhi
27	Anti-Hypertensive agents	Dr. Bikash Medhi
28	Anticoagulants	Dr. Bikash Medhi
29	Antiplatelet drugs	Dr. Bikash Medhi
30	Thrombolytics	Dr. Bikash Medhi
31	Pharmacokinetics: Absorption and distribution	Dr. Bikash Medhi
32	Alzheimer's Disease and Drug Therapy	Dr. Bikash Medhi
33	Corticosteroids	Dr. Bikash Medhi
34	Drug Therapy of Parasitic Infestations	Dr. Bikash Medhi

## 2.6. PHYSIOLOGY

The comprehensive curriculum in Physiology for I MBBS students in India requires about 100 hours of video lectures. Physiology teaching in Indian medical colleges is structured as systems Physiology under the following headings:

General physiology (Cell Physiology: Membrane transport, Membrane potentials, Body fluids)

Blood, Skeletal muscle, Excretory system, Digestive system, Respiratory system, Cardiovascular system, Endocrine system, Reproductive system, Nervous system and special senses

In the first phase the following lectures have been completed:





2.6.1. GENERAL PHYSIOLOGY (CELL PHYSIOLOGY AND BODY FLUIDS)

**Duration of the Course: 10 Hours**

**Number of lectures: 22**

**Faculty: Dr. Sathya Subramani, Dr. Anand Bhaskar, Dr. Vinay Oommen**

No.	Topic
1.	The Cell Membrane: lipids
2.	The Cell Membrane: Proteins
3.	Membrane Transport: Ion Channels part 1
4.	Membrane Transport: Ion channels part 2
5.	Membrane Transport: Facilitated diffusion
6.	Membrane transport: Secondary active transporters
7.	Membrane Transport: Secondary active transporters and ABC transporters
8.	Cell signaling mechanisms part I
9.	Cell signaling mechanisms part II
10.	Cell signaling mechanisms part III
11.	Cell signaling mechanisms part IV
12.	Cell signaling mechanisms part V
13.	Cell signaling VI ionotropic receptors
14.	Donnan effect and equilibrium
15.	Membrane potential
16.	Action potential part 1
17.	Action potential part 2
18.	Calcium transporters
19.	Cardiac action potentials
20.	Body fluids
21.	Osmosis
22.	Oedema



## 2.6.2: HYDROGEN ION HOMEOSTASIS

Duration of the Course: 5 Hours

Number of lectures: 11

Faculty: Dr. Sathya Subramani

No.	Topic
1.	Sources of acid
2.	Chemistry fundamentals
3.	Buffering of carbon dioxide in venous blood
4.	Buffering of fixed acids
5.	Role of kidneys
6.	Overview of acid/base disorders
7.	Metabolic acidosis
8.	Metabolic acidosis – Renal tubular acidoses
9.	Metabolic alkalosis
10	Respiratory alkalosis
11.	Respiratory acidosis

## 3. SUMMARY OF THE NUMBER OF COURSES COMPLETED:

Sl No	Discipline	Number of Lectures	Total Duration
1	Anatomy	40	27:35:19
2	Biochemistry	17	20:15:00
3	Microbiology	51	26:35:38
4	Pathology	47	18:14:53
5	Pharmacology	33	20:27:05
6	Physiology	32	15:08:56
<b>Total duration of all disciplines updated</b>			<b>128:17:27</b>



**4. STATUS UPDATE OF THE COMPLETED RECORDING:**

4.1. ANATOMY

4.1.1. UPPER LIMB

S.No	Topic	Name of the expert	Duration
1	Brachial Plexus	Dr T Vijaya Sagar	00:50:45
2	Mammary Gland	Dr Gaurav Agnihotri	00:17.44
3.	Shoulder Joint	Dr Gunapriya Raghunath	00:27.59
4.	Median Nerve	Dr Shubha Sudarshan	00:56.21
5.	Radial nerve	Dr Rema Devi	00:22.56
6.	Palmar spaces	Dr Daksha Dikshit	00:39.14

4.1.2. LOWER LIMB

S.No	Topic	Name of the expert	Duration
7.	Hip Joint	Dr T Vijaya Sagar	00:30.15
8.	Knee Joint	Dr T Vijaya Sagar	00:59.32
9.	Sciatic Nerve	Dr Shubha Sudarshan	00:21.02
10.	Popliteal fossa	Dr D Ravichandran	00:42.11
11.	Arches of the foot	Dr Rema Devi	00:26.30
12.	Venous Drainage of lower limb	Dr Daksha Dixit	00:31.56

4.1.3. THORAX

S.No	Topic	Name of the expert	Duration
13.	Gross anatomy of Heart	Dr Gaurav Agnihotri	00:25.13
14.	Coronary Circulation	Dr Shubha Sudarshan	01:04.54
15.	Lungs	Dr Rema Devi	00:45.16
16.	Pericardium	Dr D Ravichandran	00:32.59
17.	Mediastinum Part I	Dr Shubha Sudarshan	00:59.59
18	Mediastinum Part II	Dr Shubha Sudarshan	00:44.37



4.1.4. ABDOMEN

S.No	Topic	Name of the expert	Duration
19	Inguinal Canal	Dr Daksha Dixit	00.49.50
20	Testis & Spermatic cord	Dr D Ravichandran	00.34.58
21	Stomach	Dr Daksha Dixit	00.54.00
22	Liver	Dr Gaurav Agnihotri	00.21.19
23	Portal Vein	Dr Gaurav Agnihotri	00.26.30
24	Duodenum	Dr Gunapriya Raghunath	00.26.53
25	Pancreas	Dr Daksha Dixit	00.35.45
26	Caecum and Vermiform appendix	Dr Shubha Sudarshan	00.40.57
27	Kidneys	Dr T Vijaya Sagar	00.43.30

4.1.5. PELVISPERINEUM

S.No	Topic	Name of the expert	Duration
28	Ischioanal fossa	Dr Gaurav Agnihotri	00.41.19
29	Uterus	Dr Daksha Dikshit	01.17.55
30	Prostate gland	Dr Shubha Sudarshan	00.39.38

4.1.6. HEAD & NECK

S.No	Topic	Name of the expert	Duration
31	Anterior triangle of neck	Dr Gaurav Agnihotri	00.54.27
32	Parotid Gland	Dr Daksha Dikshit	00.44.18
33	Thyroid Gland	Dr Shubha Sudarshan	00.53.21
34	Submandibular gland	Dr Gaurav Agnihotri	00.19.54
35	Tongue	Dr T Vijaya Sagar	
36	Soft Palate	Dr Gaurav Agnihotri	00.33.43
37	Pharynx	Dr Shubha Sudarshan	01.01.03
38	Larynx	Dr Daksha Dikshit	01.05.36
39	Dural Venous Sinuses	Dr Daksha Dixit	00.55.32
40	Middle Ear	Dr Rama Devi	00.41.04
41	Lateral wall of Nose	Dr Daksha Dixit	00.34.21
<b>All Lecture total</b>			<b>27.35.19</b>



## 4.2. BIOCHEMISTRY

### 4.2.1. BLOCK 1 – ENZYMES

S.NO	BLOCK 1: ENZYME TOPICS	FACULTY	DURATION	STATUS
1.1	Active site	Dr. Pragna Rao	30 min	Completed
1.2	Mechanism of enzyme action	Dr. Vinutha. R. Bhat	30 min	Completed
1.3	Applications and importance of factors affecting enzyme action	Dr. Krishnananda Prabhu. R. V.	30 min	Completed
1.4	Coenzymes and cofactors	Dr. Krishnananda Prabhu. R. V.	30 min	Completed
1.5	Types of enzymes	Dr. Nagamma. T	30 min	Completed
1.6	Zymogens	Dr. Indira Adiga. K.	30 min	Completed
1.7	Isoenzymes	Mr. Bijay. K. Barik	30 min	Completed
1.8	Role of enzymes in IEM	Dr. Anupama Hegde	30 min	Completed
1.9	Epigenetics	Dr. Babi Dutta	30 min	Completed
1.11	Post translational modifications	Dr. Chandrika. D. Nayak	30 min	Completed
1.12	Clinical applications of enzyme inhibition	Dr. Chandrika. D. Nayak	30 min	Completed

### 4.2.2. BLOCK 2 - AMINOACIDS

S.NO	BLOCK 2: AMINO ACIDS & PROTEIN CHEMISTRY	FACULTY	DURATION	STATUS
2.1	understanding structural organization of proteins as a basis for understanding its function	Dr. Ravindra Maradi	30 min	Completed
2.2	Plasma proteins in health and disease	Dr. Maya Roche	30 min	Completed
2.3	Sources of Ammonia, detoxification and associated disorders	Dr. Ravindra Maradi	90 min	Completed
2.4	Overview of metabolism of the following amino acids and its application in understanding the associated inborn errors of	Dr. Ravindra Maradi	60 min	Completed



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	metabolism and build up of secondary metabolites i. Glycine ii Sulphur containing amino acids			
2.5	Overview of neurotransmitter metabolism with emphasis on myasthenia gravis and Parkinson's disease	Dr. Nagamma. T	30 min	Completed

#### 4.2.3. BLOCK 3 - HEME METABOLISM; ROLE OF LIVER

S.NO	BLOCK 3: HEME METABOLISM; ROLE OF LIVER	FACULTY	DURATION	STATUS
3.1	heme containing compounds, structure of heme, understanding reactions of heme synthesis to relate it with the biochemical basis of lead poisoning and findings in porphyria cutanea tarda and acute intermittent porphyria	Dr. Krishnananda Prabhu. R. V.	90 min	Completed
3.2	Application of structural knowledge of hemoglobin in understanding the genetics and pathogenesis of major hemoglobinopathies	Dr. Krishnananda Prabhu. R. V.	30 min	Completed
3.3	Catabolism of heme	Dr. Chandrika. D. Nayak	30 min	Completed
3.4	Formation and fate of bilirubin	Dr. Chandrika. D. Nayak	30 min	Completed
3.5	Jaundice: A introduction classification and causes of each type with emphasis on physiologic jaundice	Dr. B. Shivananda Baliga	30 min	Completed
3.6	Biochemical basis for findings and role of laboratory investigations in differential diagnosis	Dr. Vijetha Shenoy Belle	60 min	Completed
3.7	Alcohol metabolism	Dr. Chandrika. D. Nayak	30 min	Completed
3.8	Biochemical basis for consequences of acute alcohol intoxication	Dr. Chandrika. D. Nayak	30 min	Completed

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## 4.2.4. BLOCK 4 - CARBOHYDRATES

S.NO	Block 4: CARBOHYDRATES	FACULTY	DURATION	STATUS
4.1	Carbohydrate absorption, enzymes involved, glycemic index and factors affecting absorption	Dr. Krishnananda Prabhu. R. V.	30 min	Completed
4.2	Glucose transporters and disorders	Dr. Krishnananda Prabhu. R. V.	30 min	Completed
4.3	Regulation of blood glucose, fate of absorbed glucose, preferential use of glucose in normal and abnormal conditions	Dr. Ravindra Maradi	60 min	Completed
4.4	Screening, diagnosis & monitoring of diabetes mellitus newer markers	Dr. Guruprasad Rao	60 min	Completed

## 4.2.5. BLOCK 5 - LIPIDS

S.NO	BLOCK 5: LIPIDS	FACULTY	DURATION	STATUS
5.1	Lipoprotein structure, chemistry and functions	Dr. Ullas Kamath	30 min	Completed
5.2	LDL receptors and metabolism; Lp(a)	Dr. Vijetha Shenoy Belle	30 min	Completed
5.3	Biochemistry of atherosclerosis	Dr. Vijetha Shenoy Belle	30 min	Completed
5.4	Role of mitochondria in lipid metabolism	Dr. Vijetha Shenoy Belle	30 min	Completed
5.5	Cholesterol important aspects of its structure and biochemical functions	Dr. Somashekar Shetty	30 min	Completed
5.6	Extended lipid profile (fasting vs non-fasting)	Dr. Varashree B. S.	60 min	Completed
5.7	Digestion and absorption (Lipases & inhibitors, reesterification, importance of bile & its clinical significance)	Dr. Krishnananda Prabhu. R. V.	30 min	Completed
5.8	Inborn errors of lipid metabolism (Lipid storage, lysosomal, oxidation disorders)	Mr. Babi Dutta	30 min	Completed
5.9	Biochemistry of lipid lowering agents	Dr. Rukmini M. S.	30 min	Completed



5.11	VLDL, fatty liver & lipotropic factors	Dr. Pragna Rao	30 min	Completed
5.12	Understanding ketosis: Conditions predisposing to ketone body formation and their significance	Dr. Chandrika. D. Nayak	30 min	Completed
5.13	Sweets are fattening: The carbohydrate to fat link	Dr. Chandrika. D. Nayak	30 min	Completed
5.14	Adipose tissue metabolism	Mr. Sambit Dash	30 min	Completed
5.15	Dysregulation of lipid metabolism in diabetes mellitus	Mr. Abhishek Chaturvedi	30 min	Completed
5.16	Hyperlipoproteinemias	Dr. Somashekar Shetty. B.	30 min	Completed

### 4.3. MICROBIOLOGY

#### 4.3.1. BLOCK-I INTRODUCTION & PRINCIPLES OF DIAGNOSIS OF INFECTIOUS DISEASES

Sl.No	Blocks / Topics	Contents	Expert	Time
1	Introduction to the course	Role & Scope of Clinical Microbiology in practice	Dr. Renu Bharadwaj	0:19: 24
2	Introduction to pathogenic <b>Bacteria</b> and their Laboratory Diagnosis (Direct Methods)	Brief morphology of bacteria, Gram staining, General steps in their laboratory diagnosis including Microscopy & Culture	Dr. Jyoti Nagmoti	0:40:25
3	Immunology in the diagnosis of Bacterial diseases & Molecular diagnosis. (Indirect Methods)	Basic Principles of Immunity, Antigen-Antibody reactions and serological reactions. PCR; types & role in diagnosis	Dr. Anju Kagal	1:06:43





4	Introduction to pathogenic <b>Viruses</b> and their Laboratory Diagnosis	Classification, and approach to their laboratory diagnosis (Direct & Indirect diagnosis)	Dr. Chhaya Chande	0:39:02
5	Introduction to pathogenic <b>Fungi</b> and their Laboratory diagnosis	Classification, Enumeration of pathogenic fungi, morphology and laboratory diagnosis	Dr. Ravinder Kaur	0:20:10.
6	Introduction to Medically important <b>Parasites</b> and their Laboratory Diagnosis	Classification, general morphology and approach to the laboratory diagnosis of parasitic Infections	Dr. Ravinder Kaur	0:15:47

## 4.3.2. BLOCK-II SKIN &amp; SOFT TISSUE INFECTIONS

Sl.No	Blocks / Topics	Contents	Expert	Time
7	Superficial Infections	Work up of a case of Carbuncle including spectrum of soft tissue infections, list of possible causative agents, its differential diagnosis, laboratory diagnosis & management <b>Staphylococcus aureus</b> : Morphology, clinical manifestations, pathogenesis & laboratory diagnosis, epidemiology & antimicrobial spectrum	Dr. Renu Bharadwaj	0:33:20
8	Gas Gangrene	Workup of a case, causative organisms. Its pathogenesis, Laboratory Diagnosis & Management	Dr. Renu Bharadwaj	0:26:17
9	Anthrax	Work up of a case of Malignant pustule: causative agent, its laboratory Diagnosis & Management	Dr. Renu Bharadwaj	0:23:42
10	Superficial Mycoses	Work up of a case, differential Diagnosis & laboratory diagnosis <b>Malassezia furfur</b> <b>Dermatophytosis</b> : Classification,	Dr. Ravinder Kaur	0:26:31



		Morphology, Clinical manifestations, Pathogenesis & Laboratory Diagnosis of pathogens.		
11	Superficial & Subcutaneous Mycoses	Work up of a case, Clinical manifestations and laboratory diagnosis of <b>Candidiasis</b> Case history, Morphology, Clinical manifestations, pathogenesis & Laboratory Diagnosis of <b>Mycetoma</b>	Dr. Ravinder Kaur	0:32:29.
12	Actinomycosis	Work up of a case, Clinical manifestations and laboratory diagnosis of Actinomycosis	Dr. Ravinder Kaur	0:16:24
13	Leprosy	Work up of Cases, Classification, Pathogenesis & laboratory diagnosis	Dr. Anju Kagal	
14	Viral Infections of the skin	Clinical case and its differential Diagnosis. Clinical presentation of Human Herpes Viruses & HPV : their morphology, pathogenesis & Laboratory Diagnosis. Discussion of other viral infections of skin	Dr. Chhaya Chande	0:32:43

#### 4.3.3. BLOCK-III RESPIRATORY TRACT INFECTIONS

Sl.No	Blocks / Topics	Contents	Expert	Time
15	Upper Respiratory Tract infections (URTI)	Work up of a case of sore throat and a list of causative agents. <b>Streptococcus pyogenes</b> : pathogenesis, laboratory diagnosis and antimicrobial spectrum	Dr. Anju Kagal	0:28:39
16	Diphtheria	Work up of a case, clinical presentation, pathogenesis, laboratory diagnosis, prevention & management	Dr. Jyoti Nagmoti	0:23:01
17	Whooping Cough	<b>Bordetella pertussis</b> infections: Case history followed by pathogenesis, sample collection, laboratory diagnosis & prophylaxis	Dr. Anju Kagal	0:13:41
18	Viral URTI	Enumerate the viruses. <b>Influenza Virus</b> : Morphology, Pathogenesis, laboratory	Dr. Chhaya Chande	0:33:19



		diagnosis, management, epidemiology & prophylaxis. Brief overview of <b>Corona viruses, RSV &amp; Parainfluenza viruses</b>		
19	Community acquired pneumonia	Case work up of a case of pneumonia. Its differential diagnosis, disease burden and causative agents. <b>Streptococcus pneumoniae:</b> pathogenesis, laboratory diagnosis, antimicrobial susceptibility and available vaccines	Dr. Jyoti Nagmoti	0:24:27
20	Atypical Pneumonia	Brief overview of <b>Chlamydia and Mycoplasma</b> & their laboratory diagnosis	Dr. Anju Kagal	0:31:20
21	Fungi causing Pulmonary Mycoses	Case history, list of causative agents, pathogenesis and laboratory diagnosis of Histoplasmosis and Aspergillosis	Dr. Ravinder Kaur	0:47:30
22	Tuberculosis	Case history followed by pathogenesis, laboratory diagnosis, Antimicrobials used for therapy & RNTCP program guidelines	Dr. Anju Kagal	0:45:16
23	Non-Tubercular Mycobacteria	Classification, Pathogenesis and laboratory diagnosis	Dr Anju Kagal	

#### 4.3.4. BLOCK-IV GASTROINTESTINAL TRACT INFECTIONS

Sl.No	Blocks / Topics	Contents	Expert	Time
24	Diarrhea	Case history, Causative agents of Diarrhea <b>E.coli</b> : Diarrheagenic <b>E.coli</b> , Clinical manifestations, pathogenesis, Laboratory Diagnosis and Antimicrobials used for therapy.	Dr Renu Bharadwaj	0:24:54
25	Viral Diarrhea	Case history, enumeration of Viruses causing diarrhea , laboratory diagnosis & prophylaxis	Dr. Chhaya Chande	
26	Cholera	Case report, Morphology, Classification, Clinical manifestations, pathogenesis &	Dr. Renu Bharadwaj	0:27:36



		Laboratory Diagnosis of <b>V.cholera</b> . In brief about other comma shaped organisms			
27	Bacillary Dysentery	Work up of a case. Causative agents of Dysentery <b>Shigella</b> : pathogenesis, Laboratory Diagnosis and antimicrobials used for therapy	Dr. Jyoti Nagmoti	0:42:24	
28	Protozoal Dysentery	<b>E.histolytica</b> : Clinical manifestations, pathogenesis, Morphology, Life cycle & Laboratory Diagnosis.	Dr. Jyoti Nagmoti	0:29:03	
29	Intestinal Protozoa causing diarrhea	Clinical presentation, laboratory diagnosis of <b>Giardia</b>	Dr. Ravinder Kaur	0:11:20	
30	Intestinal Sporozoa	Clinical presentation, laboratory diagnosis of <b>Sporozoa</b>	Dr. Ravinder Kaur	0:32:54	
31	Parasitic infestations: Intestinal Nematodes	Clinical Presentation, Morphology, Life cycle Pathogenesis and laboratory diagnosis of <b>A.lumbricoides, E.vermicularis, T.trichura.</b>	Dr. Anju Kagal	0:40:32	Dr Anju
32	Parasitic infestations: Intestinal Nematodes Part 2	Clinical Presentation, Morphology, Life cycle, Pathogenesis and laboratory diagnosis of <b>A.duodenale, S.stercoralis,</b>	Dr. Anju Kagal	0:35:51	
33	Parasitic infestations: Cestodes	Clinical presentation, Etiological agents, Morphology, Life cycle, Pathogenesis and laboratory diagnosis of <b>Taenia solium , Taenia saginata and Echinococcus granulosus.</b>	Dr. Anju Kagal	0:35:51	
34	Food Poisoning	Clinical case, enumeration of etiological agents, Source, and Investigations of outbreaks of Food Poisoning. <b>(B.cereus, C.perfringens, S. Aureus, C.botulinum, V.parahemolyticus)</b>	Dr. Chhaya Chande	0:41:39	

4.3.5. BLOCK-V UROGENITAL INFECTIONS



Sl.No	Blocks / Topics	Contents	Expert	Time
35	Urinary Tract Infection	Work up of a case. Definition, Differential diagnosis and laboratory diagnosis of Urinary Tract Infection. Enterobacteriaceae & in brief about Uropathogenic <b><i>E.coli, Proteus and Klebsiella</i></b>	Dr. Renu Bharadwaj	0:28:43
36	Urethritis - Gonorrhoea	Case history, Differential Diagnosis <b><i>N.gonorrhoeae</i></b> : Pathogenesis, Clinical features ,laboratory diagnosis and antimicrobials used for therapy	Dr. Jyoti Nagmoti	0:23:56
37	Non-Gonococcal Urethritis (NGU)	<i>Case history, Clinical features and laboratory diagnosis of T.vaginalis, G.vaginalis, C.trachomatis, M.hominis, U.urealyticum</i> infections causing NGU	Dr. Jyoti Nagmoti	0:35:10
38	Genital Ulcers & other Genital tract infections	Work up of a case, differential diagnosis and epidemiology. <b><i>T.pallidum</i></b> : Clinical features, complications & laboratory diagnosis of <b><i>Syphilis</i></b> Brief Account of <b><i>H.ducreyi, Lymphogranuloma venereum, Granuloma inguinale</i></b>	Dr. Jyoti Nagmoti	0:38:10
39	Viral STD: HIV	<b>HIV</b> : Clinical presentation, Morphology, pathogenesis & Laboratory Diagnosis	Dr. Chhaya Chande	0:49:55

## 4.3.6. BLOCK-VI LIVER AND BILIARY SYSTEM

Sl.No	Blocks / Topics	Contents	Expert	Time
40	Acute Hepatitis	Work up of a case of infective hepatitis, Brief Introduction, disease burden and Causative agents of Acute hepatitis Morphology, Classification, Clinical manifestations, pathogenesis & Laboratory Diagnosis of <b><i>Hepatitis A</i></b> and <b><i>Hepatitis E Viruses</i></b>	Dr. Chhaya Chande	0:26:43
41	Chronic Hepatitis	Morphology, Classification, Clinical manifestations, pathogenesis & Laboratory Diagnosis of <b><i>Hepatitis B, C and D Viruses</i></b>	Dr. Ravinder Kaur	0:42:51



## 4.3.7. BLOCK-VII CNS INFECTIONS

Sl.No	Blocks / Topics	Contents	Expert	Time
42	Meningitis	Clinical case. Differential Diagnosis, and laboratory diagnosis of Meningitis <b><i>N.meningitidis, H.influenzae:</i></b> Pathogenesis and laboratory diagnosis.	Dr. Renu Bharadwaj	0:33:53
43	Chronic meningitis	Case, Differential Diagnosis and laboratory diagnosis. Cryptococcal Meningitis & TB meningitis: Laboratory diagnosis and therapy.	Dr. Ravinder Kaur	0:43:02
44	Encephalitis	Work up of a case, disease burden, clinical features and laboratory diagnosis of Encephalitis <b><i>Arboviruses</i></b> causing encephalitis : <b><i>Japanese encephalitis virus</i></b>	Dr. Chhaya Chande	0:44:15
45	Acute Flaccid Paralysis	<b><i>Poliomyelitis:</i></b> Clinical presentation, laboratory Diagnosis, Epidemiology & Immunization	Dr. Chhaya Chande	0:32:03
46	Brain abscess	Case presentation, Differential Diagnosis and Laboratory diagnosis In brief about <b><i>Nonsporing anaerobes</i></b>	Dr. Jyoti Nagmoti	0:35:44
47	Parasites infecting the CNS	Clinical presentations, enumerate the pathogens and laboratory diagnosis. Primary amoebic mening0-encephalitis: <b><i>Acanthamoeba, Naegleria</i></b>	Dr. Ravinder Kaur	0:27:03
48	Bacterial Toxins affecting the Nervous system	<b><i>Clostridium tetani, Clostridium botulinum</i></b>	Dr. Renu Bharadwaj	0:33:24
49	Other Viral CNS infections	Introduction, Pathogenesis and laboratory diagnosis of <b><i>Rabies</i></b>	Dr. Chhaya Chande	0:30:42

## 4.3.8. BLOCK-VIII PYREXIA OF UNKNOWN ORIGIN



Sl.No	Blocks / Topics	Contents	Expert	Time
50	PUO Typhoid and Paratyphoid fevers	Case of PUO, Definition, Differential Diagnosis, and Laboratory Diagnosis of PUO. Morphology, Pathogenesis, Clinical features and laboratory diagnosis of <b><i>S.typhi</i></b> , & <b><i>S.paratyphi</i></b> infections	Dr. Renu Bharadwaj	0:36:37
51	Brucellosis, Leptospirosis	Clinical features, Pathogenesis, Clinical features and laboratory diagnosis of <b><i>Brucellosis</i></b> , <b><i>Leptospirosis</i></b>	Dr. Renu Bharadwaj	0:29:58
52	Rickettsial infections	Clinical features, Pathogenesis, Clinical features and laboratory diagnosis of <b><i>Rickettsial infections</i></b>	Dr. Jyoti Nagmoti	0:29:19
53	Viral fevers	Clinical features, list of causative agents, Disease burden, pathogenesis, Clinical features and Laboratory diagnosis of <b><i>Dengue</i></b> and <b><i>Chikungunya</i></b> virus infections	Dr. Ravinder Kaur	0:24:35
54	Malaria	Clinical features, disease burden, pathogenesis, Life cycle and Laboratory diagnosis of <b><i>Plasmodium</i></b> infections	Dr. Anju Kagal	
55	Filariasis	Clinical features, disease burden, pathogenesis, Life cycle and Laboratory diagnosis of <b><i>W.bancrofti</i></b> In brief about <b>Trypanosomiasis</b>	Dr. Jyoti Nagmoti	0:22:46

## 4.3.9. BLOCK-IX HOSPITAL ACQUIRED INFECTIONS &amp; MISCELLANEOUS

Sl.No	Blocks / Topics	Contents	Expert	Time
56	Hospital Acquired Infections (HAI)	Definition, Etiological agents, Pathogenesis, Source tracing and laboratory diagnosis (with special reference to: <b><i>Pseudomonas and</i></b> <b><i>Acinetobacter</i></b> )	Dr. Jyoti Nagmoti	0:28:39
57	Prevention of HAI	Universal safety precautions, Care bundles in relation to VAP, SSI, CRBSI, UTI	Dr. Anju Kagal	
58	Biomedical Waste its Management	Introduction, Waste categories, Waste treatment and Disposal	Dr. Ravinder Kaur	0:25:17



4.4. PATHOLOGY

4.4.1. CELLULAR RESPONSES TO INJURY

1	1.1	What is Pathology?	00:34:46	Dr. Annamma Kurien/ Dr. K. Ramnarayan
2	1.2	Cellular Adaptation – Adapt to survive	00:30:55	
3	1.3	Differentiation and altered differentiation	00:27:39	
4	1.4	Necrosis	00:26:00	
5	1.5	Apoptosis	00:17:09	
6	1.6	Intracellular accumulations	00:23:58	

4.4.2. ACUTE & CHRONIC INFLAMMATION

7	2.1	Inflammation 1	00:20:32	Dr. Kanthilatha Pai/ Dr. K. Ramnarayan
8	2.2	Inflammation 2	00:24:23	
9	2.3	Inflammation 3	00:28:32	
10	2.4	Chemical mediators- Cell derived	00:18:54	
11	2.5	Chemical mediators- Plasma protein derived		
12	2.6	Patterns of acute inflammation	00:20:26	
13	2.7	Granulomatous inflammation		

4.4.3. WOUND HEALING

14	3.1	Cell cycle	00:14:57	Dr. Sharada Rai
15	3.2	Wound healing- Primary & Secondary	00:29:23	
16	3.3	Factors affecting wound healing & common complications	00:17:24	
17	3.4	Fracture healing	00:15:12	

4.4.4. CIRCULATORY DISTURBANCES

18	4.1	Edema	00:13:26	Dr. Hema Kini
19	4.2	Hyperemia & Congestion	00:19:33	
20	4.3	Embolism- I & II	00:23:06	





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			00:24:07	
21	4.4	Infarction	00:18:53	
22	4.5	Shock	00:18:41	

#### 4.4.5. GENETICS

23	5.1	Prenatal diagnosis of genetic conditions	00:27:40	Dr. Girisha. K. M.
24	5.2	Genetic counselling & patterns of inheritance	00:30:53 00:34:47	
25	5.3	Genetic testing/Genetic basis of cancer & familial cancers/Approach to a dysmorphic child	00:28:59	

#### 4.4.6. IMMUNOLOGY

26	6.1	Diseases of the immune system	00:21:35	Dr. Deepak Nayak. M.
27	6.2	Hypersensitivity Reactions	00:27:19	
28	6.3	Autoimmunity	00:20:38	
29	6.4	Systemic Lupus Erythematosus (SLE)	00:26:37	
30	6.5	Rejections of tissue transplants	00:19:27	
31	6.6	Immunodeficiency	00:25:11	
32	6.7	HIV & AIDS		
33	6.8	Amyloidosis	00:21:04	

#### 4.4.7. INFECTIOUS DISEASES

34	7.1	Tuberculosis-1	00:22:48	Dr. Sharada Rai
35	7.2	Tuberculosis-2		
36	7.3	Leprosy	00:09:40	

#### 4.4.8. NEOPLASIA

37	8.1	Properties of cancers	00:26:40	Dr. Anuradha Ananthamurthy
38	8.2	Cancer epidemiology	00:22:52	
39	8.3	Cancer genes	00:29:21	

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40	8.4	Hallmarks of cancer	00:20:03	
41	8.5	Tumor suppressor genes, viral oncogenesis	00:24:59	
42	8.6	Sustained angiogenesis, invasion and metastasis	00:15:30	
43	8.7	Tumor immunity, genomic instability and cancer	00:15:48	
44	8.8	Clinical aspects of neoplasia	00:26:49	

#### 4.4.9. METABOLIC DISEASES

45	9.1	Diabetes Mellitus 1	00:22:32	Dr. Deepak Nayak
46	9.2	Diabetes Mellitus 2- Clinical features	00:25:42	

#### 4.5. PHARMACOLOGY

Sl. No	Title	Expert	Duration
1	Drugs used in Asthma	Dr. Y. K. Gupta	0:49:45
2	Constipation	Dr. Y. K. Gupta	0:22:45
3	Diarrhea and constipation	Dr. Y. K. Gupta	0:22:52
4	Glaucoma	Dr. Y. K. Gupta	0:19:29
5	Myasthenia gravis	Dr. Y. K. Gupta	0:15:48
6	Emetics and anti-emetics	Dr. Y. K. Gupta	0:45:33
7	Drugs used in parkinsons disease	Dr. Y. K. Gupta	0:48:47
8	How Drug Act?	Dr. Y. K. Gupta	0:40:25
9	Drugs used in Peptic ulcer disease	Dr. Y. K. Gupta	0:46:20
	<b>Total Hours</b>		<b>5:11:14</b>
10	Analgesics and anti-inflammatory agents	Dr. Santanu Kumar Tripathi	0:31:58
11	Bioavailablity and Bioequivalenlence	Dr. Santanu Kumar Tripathi	0:59:31
12	Analgesics and antiinflammatory agents_12-11-18	Dr. Santanu Kumar Tripathi	0:55:50
13	Uterotonics and Tocolytics	Dr. Santanu Kumar Tripathi	0:22:02
14	Uterotonics contd.	Dr. Santanu Kumar Tripathi	0:22:34



15	Antimuscarinic drugs	Dr. Santanu Kumar Tripathi	0:18:16
16	Drug abuse and drug dependence	Dr. Santanu Kumar Tripathi	0:46:50
17	Cancer Chemotherapy Principles and Practice	Dr. Santanu Kumar Tripathi	0:33:40
18	Analgesics and anti-inflammatory agents	Dr. Santanu Kumar Tripathi	0:31:58
	<b>Total Hours</b>		<b>4:50:41</b>
19	Pharmacology of Beta Blockers	Dr. Bikash Medhi	0:43:19
20	Autocoids	Dr. Bikash Medhi	0:36:01
21	Local anesthetics	Dr. Bikash Medhi	0:50:50
22	Pharmacokinetics: Biotransformation and elimination	Dr. Bikash Medhi	0:44:18
23	Adrenaline and other sympathomimetics	Dr. Bikash Medhi	1:01:52
24	Contraceptive agents	Dr. Bikash Medhi	0:54:33
25	Pharmacotherapy in glaucoma	Dr. Bikash Medhi	0:22:18
26	Anti-Epileptic Drugs	Dr. Bikash Medhi	0:34:06
27	Anti-Hypertensive agents	Dr. Bikash Medhi	0:37:56
28	Anticoagulants	Dr. Bikash Medhi	0:36:11
29	Antiplatelet drugs	Dr. Bikash Medhi	0:18:46
30	Thrombolytics	Dr. Bikash Medhi	0:14:22
31	Pharmacokinetics: Absorption and distribution	Dr. Bikash Medhi	0:46:36
32	Alzheimer's Disease and Drug Therapy	Dr. Bikash Medhi	0:17:48
33	Corticosteroids	Dr. Bikash Medhi	0:49:58
34	Drug Therapy of Parasitic Infestations	Dr. Bikash Medhi	0:56:16
	<b>Total Hours</b>		<b>10:25:10</b>
	<b>Grand total</b>		<b>20:27:05</b>

#### 4.6. PHYSIOLOGY

##### 4.6.1. GENERAL PHYSIOLOGY (CELL PHYSIOLOGY AND BODY FLUIDS)

Sl No	Title	Expert	Duration
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1	GP 1: Cell Membrane: lipids	Dr. Sathya Subramani	0:22:57
2	GP 2: Cell Membrane: Proteins	Dr. Sathya Subramani	0:22:38
3	GP 3: Membrane Transport: Ion channels part 1	Dr. Vinay Timothy Oommen	0:28:27
4	GP 4: Membrane Transport: Ion channels part 2	Dr. Vinay Timothy Oommen	0:28:27
5	GP 5: Membrane Transport: Facilitated diffusion	Dr. Sathya Subramani	0:33:19
6	GP 6: Membrane transport: Secondary active transporters	Dr. Sathya Subramani	0:32:16
7	GP 7: Membrane Transport: Primary active transporters and ABC transporters	Dr. Sathya Subramani	0:26:20
8	GP 8: Cell signaling mechanisms part I	Dr. Sathya Subramani	0:15:51
9	GP 9: Cell signaling mechanisms part II	Dr. Sathya Subramani	0:15:44
10	GP 10: Cell signaling mechanisms part III	Dr. Sathya Subramani	0:19:30
11	GP 11: Cell signaling mechanisms part IV	Dr. Sathya Subramani	0:22:10
12	GP 12: Cell signaling mechanisms part V	Dr. Sathya Subramani	0:36:07
13	GP 13: Cell signaling mechanisms part VI- ionotropic receptors	Dr. Sathya Subramani	0:18:47
14	GP 14: Donnan effect and equilibrium	Dr. Sathya Subramani	0:20:57
15	GP 15: Membrane potential	Dr. Sathya Subramani	0:41:21
16	GP 16: Action potential part 1	Dr. Sathya Subramani	0:28:56
17	GP 17: Action potential part 2	Dr. Sathya Subramani	0:39:04
18	GP 18: Calcium transporters	Dr. Anand Bhaskar	0:30:32
19	GP 19: Cardiac action potentials	Dr. Anand Bhaskar	0:37:11
20	GP 20: Body fluids	Dr. Vinay Timothy Oommen	0:29:30
21	GP 21: Osmosis	Dr. Vinay Timothy Oommen	0:30:44
22	GP 22: Oedema	Dr. Anand Bhaskar	0:13:11

#### 4.6.2. HYDROGEN ION HOMEOSTASIS

Sl No	Title	Expert	Duration
1	HH 1: Introduction and sources of acid	Dr. Sathya Subramani	0:23:47
2	HH 2: Chemistry fundamentals	Dr. Sathya Subramani	0:21:37



3	HH 3: Buffering of carbon dioxide in venous blood	Dr. Sathya Subramani	0:24:28
4	HH 4: Buffering of fixed acids	Dr. Sathya Subramani	0:20:01
5	HH 5: Role of kidneys	Dr. Sathya Subramani	0:44:12
6	HH 6: Overview of acid-base disorders	Dr. Sathya Subramani	0:11:26
7	HH 7: Metabolic acidosis	Dr. Sathya Subramani	0:20:05
8	HH 8: Metabolic acidosis - renal tubular acidosis	Dr. Sathya Subramani	0:26:53
9	HH 9: Metabolic alkalosis	Dr. Sathya Subramani	0:39:43
10	HH 10: Respiratory alkalosis	Dr. Sathya Subramani	0:28:02
11	HH 11: Respiratory acidosis	Dr. Sathya Subramani	0:28:02

## 5. REVIEWERS LIST:

### 5.1. ANATOMY

#### List of reviewers

Name	Designation	Institution	E-mail ID
Dr. Deepti Shastri	Deputy Dean (Academics) Professor & Head Department of Anatomy	Vinayaka Mission's Kirupananda Variyar Medical College & Hospital Salem – 636308 Tamil Nadu.	Deeptishastrimukherjee@gmail.com
Dr. V. Subhadra Devi	Professor and Head Department of Anatomy	SVIMS – Sri Padmavathi Medical College for Women Tirupati – 517507 Andhra Pradesh	Sdvelichety@hotmail.com
Dr. P. Vatsalaswamy	Director Academics Director(IQAC)	Dr. D. Y. Patil Medical College Hospital & Research Centre Dr. D. Y. Patil Vidyapeeth Pimpri, Pune-411018	Puranamv@gmail.com



## 5.2. BIO-CHEMISTRY

**List of potential physiology reviewers**

Review will be internal using the faculty.

## 5.3. MICROBIOLOGY

**List of reviewers**

Name	Designation	Institution	E-mail ID
Brigadier K. K. Lahiri ( Retd)	Prof & HOD, Dept of Microbiology	Bharati Vidyapeeth Deemed University Medical College Medical College Road, Pune Satara Road Dhankawadi, Pune Maharashtra 411043	Email: <a href="mailto:lahirikunal@hotmail.com">lahirikunal@hotmail.com</a>
Dr. Neeta Jangale	Prof & HOD Microbiology	Rajarshi Chhatrapati Shahu Maharaj Govt Medical College Bhausinghajiroad Dasara Chowk, Rajendra Nagar Kolhapur Maharashtra 416013	Email: <a href="mailto:drneetaj@gmail.com">drneetaj@gmail.com</a>

## 5.4. PATHOLOGY

**List of reviewers**

Name	Designation	Institution	E-mail ID
Dr. C. V. Raghuveer, MD, DCP	Pro Vice Chancellor & Professor of Pathology	YENEOYA (Deemed to be University) University Road Deralakatte Mangalore – 575018 Karnataka	<a href="mailto:Raghuveer.rao3@gmail.com">Raghuveer.rao3@gmail.com</a>
Dr. Thoppil Reba Philipose, MD, DCP	Professor of Pathology	A. J. Institute of Medical Sciences Kuntikana Mangalore – 575004 Karnataka	<a href="mailto:Rebaphilipose@yahoo.com">Rebaphilipose@yahoo.com</a>



## 5.5. PHARAMACOLOGY

Will be published once the entire course is finished.

## 5.6. PHYSIOLOGY

### List of reviewers

<b>Name</b>	<b>Designation</b>	<b>Institution</b>	<b>E-mail ID</b>
Dr. Vivek Kumar Sharma Ph – (+91) 9442529673 8668117030	DEAN & Professor & Head, Department of Physiology,	Government Institute of Medical Sciences, King George Medical University Greater NOIDA, Uttar Pradesh, INDIA-201310	<a href="mailto:drviveksharma@yahoo.com">drviveksharma@yahoo.com</a>
Dr. C. C. Umayal	Associate Professor	Department of Physiology Stanley Medical College Chennai	<a href="mailto:cumayal@hotmail.com">cumayal@hotmail.com</a>
Dr. Anna. T. Valson, MD, DM	Professor	Department of Nephrology Christian Medical College, Vellore	<a href="mailto:ceruleus@gmail.com">ceruleus@gmail.com</a>