VELAMMAL MEDICAL COLLEGE
HOSPITAL AND RESEARCH INSTITUTE
MADURAI - 625009

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Sample copies of Course Files

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Dean
Velammal Medical College Hospital
and Research Institute
'Velammal Village'
Madurai-Tuticorin Ring Road
Anuppanadi, Madurai (TN)-625 009

Velammal Medical College

Hospital and Research Institute

Madurai-09

Course File

First MBBS – 2021 – 2022

Department of Biochemistry

Velammal Medical College Hospital and Research Institute

Anuppanadi – Madurai-09

COURSE FILE

Department	Department of Biochemistry
Year to whom subject is offered	First year MBBS
Name of the Subject	Biochemistry

Faculty Names

Dr. P.K. Mohanty	Professor and HOD
Dr. K. Suganthy	Professor
Dr. Mamatha T Shenoy	Associate Professor
Dr. A. Hariharan	Assistant Professor
Dr. R. Asothai	Assistant Professor
Dr. M.Viveka	Assistant Professor

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Velammal Medical College Hospital and Research Institute

Anupanadi – Madurai-09

COVER PAGE

DEPARTMENT OF BIOCHEMISTRY

Name of the Subject	BIOCHEMISTRY
Program	Undergraduate
Year	First year MBBS

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Design: : Assistant Professor

Date: : 10th March 2022

Approved by

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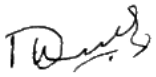
Sign : 

Designation : Head of the Department

Date : 10th March 2022

Vision and Mission of the Institution

Our Vision

To build a healthy society with dedicated, well qualified and experienced doctors & supporting staff by easily offering to people the world-class health care services at an affordable cost.

Our Mission:

Our mission is to provide healthcare services at an affordable cost. We are committed to continuously improving our quality and maintaining high standards of patient care with excellence, competence and compassion by following the best practices in the healthcare industry.

Vision and Mission of Department of Biochemistry

VISION

Department of biochemistry is a centre of excellence for study of biochemistry for Basic to expanding health information, Health Education and research which are the fundamental right of every human being to be provided to gross root level health care nationally and internationally.

MISSION

- To produce well informed, innovative, inquisitive, intuitive, ethical, socially committed, self disciplined, hard working health care providers with adequate knowledge of all medical sciences in biochemistry which is the study of the fundamental chemical that make up of the human body in the health and earliest chemical changes at the micro and macro level in diseases which precede all other types of manifestations.
- To inculcate and instill scientific wisdom and research acumen in the young minds on the needs of the patient and the public.
- To promote evidence based holistic approach to health care

Biochemistry Course Objective

BI-1 : Basic Biochemistry

BI 1.1 Describe the molecular and functional organization of a cell and its sub-cellular components

- Discuss the importance of fluid mosaic model and its components with a neatly labeled diagram.
- Enumerate the factors affecting membrane fluidity and list functions of different membrane proteins.
- Describe role of carbohydrates in cell to cell recognition.
- Explain the metabolic role of sub cellular organelles and an enzyme marker to identify them.
- Distinguish between carrier proteins and channel proteins.
- Distinguish between osmosis, diffusion and facilitated diffusion.
- Distinguish between exocytosis and receptor mediated endocytosis.
- Compare and discuss the various transport mechanisms across cell membrane with a special emphasis on glucose and lipid transport using schematic diagram.

BI-2 Enzyme

BI 2.1 Explain fundamental concepts of enzyme, isoenzyme, alloenzyme, coenzyme and cofactors. Enumerate the main classes of IUBMB nomenclature.

- Define and classify enzymes as per IUBMB classification and give suitable examples.
- Discuss the biochemical role of cofactors, coenzymes and alloenzymes with examples.
- Define isoenzymes and discuss the clinical importance of isoenzymes with examples.

BI 2.2 Observe the estimation of SGOT and SGPT

- Describe the principles and clinical significance of the estimation of SGOT (AST) and SGPT (ALT).

BI 2.3 Describe and explain the basic principles of enzyme activity.

- Explain the relevance of the Michaelis- Menten equation and Km value.

- Discuss the various factors affecting enzyme activity.
- Describe the mode of action of enzymes.
- Explain the mechanism of covalent and allosteric regulation.
- Analyze the importance and role of Lineweaver Burk plot in enzyme inhibition.
- Discuss the kinetics of enzymes with emphasis on reaction velocity, order of kinetics.

BI-2.4 Describe and discuss enzyme inhibitors as poisons and drugs and as therapeutic enzymes

- Define and classify enzyme inhibitors.
- Illustrate, with examples, competitive, non-competitive and uncompetitive enzyme inhibition using LB plot
- Identify the types of enzyme inhibition by using the LB plot.
- Discuss the mechanism of suicidal inhibition with suitable examples.
- Explain the role of allosteric modifiers.
- Explain with suitable examples the therapeutic application of enzyme inhibitors.
- Discuss enzyme inhibition by toxins or poisons using suitable examples.

BI-2.5 Describe and discuss the clinical utility of various serum enzymes as markers of pathological conditions.

- Enumerate the differences between functional and non- functional plasma enzymes.
- Discuss the diagnostic importance of enzymes and isoenzymes in cardiac, liver, pancreatic ,bone and prostate disorders.
- Explain the mechanisms of alterations of enzymes and isoenzymes in disorders of heart, liver, pancreas, bone and prostate.
- Describe the role of enzymes as tumor markers.
- Discuss the therapeutic importance of enzymes and isoenzymes with examples.

BI-2.6 Discuss use of enzymes in laboratory investigations (Enzyme-based assays)

- Describe the role of enzymes as labels in diagnostic techniques such as ELISA, FEIA, other EIAs.
- Justify the use of enzymes in diagnostic assays.
- Discuss the application of enzymes in molecular diagnostics –like PCR, and other immunoassays.

BI-2.7 Interpret laboratory results of enzyme activities & describe the clinical utility of various enzymes as markers of pathological conditions.

- Discuss the utility and interpretation of enzymes in various disorders such as cardiac, liver ,bone pancreatic and prostrate.

BI-3 Chemistry and Metabolism of Carbohydrates

BI-3.1 Discuss and differentiate monosaccharides, di-saccharides and polysaccharides giving examples of main carbohydrates as energy fuel, structural element and storage in the human body

- Identify the common monosaccharides, disaccharide and polysaccharides based on their structural differences
- Discuss the isomeric forms of monosaccharides giving example of glucose, fructose and galactose
- Differentiate between a reducing and nonreducing sugar
- Elaborate the structure of glycogen, its significance as a storage poly saccharide and difference with starch
- Elaborate the properties and reactions of monosaccharide- namely mutarotation, reducing property, osazone formation oxidation, ester formation, amino sugar formation
- Elaborate the glycation, advanced glycation and carbonylation reaction of monosaccharides , their health implications and applications in a diagnostic laboratory
- Define glycosidic bonds
- Identify the common disaccharides present in human body and their component monosaccharides with type of glycosidic bonds between them.
- Justify sucrose as a non reducing disaccharide
- Justify sucrose as an invert sugar
- Describe the structural attributes of glycogen and its difference with starch
- Explain how the structural characteristics of glycogen makes it ideal storage form of glucose

BI-3.2 Describe the processes involved in digestion and assimilation of dietary carbohydrates and their storage

- Define the process of digestion of food
- Name the major dietary carbohydrates
- Describe the process of digestion of dietary starch to glucose with the intermediate formation of dextrins in the GIT specifying the enzymes involved, their locations and their specific actions
- Justify why dietary cellulose serves as an undigested roughage in humans
- Describe the digestion and absorption of dietary disaccharides
- Explain the biochemical basis of lactose intolerance, Its symptoms and laboratory reports.
- Explain the mechanism of the transport of glucose by SGLUT1 and GLUT2 through the intestinal brush borders and illustrate the same diagrammatically.
- Describe the common biochemical and clinical features of GLUT-2 deficiency
- Explain the biochemical basis of the efficacy of oral hydration therapy in the treatment of diarrhea.
- Describe the mechanism of the intestinal transport of other dietary monosaccharides
- Discuss the mechanism of inhibitory effects of Ouabain, Cytochalasin and Phlorizin on the intestinal glucose transport

BI-3.3 Define and differentiate the pathways of carbohydrate metabolism (glycolysis, gluconeogenesis, glycogen metabolism, HMP shunt)

- Glycogen Metabolism:
    - State the metabolic fate of glucose, the pathways of glucose metabolism
    - Describe the structure function relationship of Glycogen
    - Define Glycogenesis and Glycogenolysis
    - Describe the steps involved in Glycogenesis from glucose/glucose 6 phosphate and Glycogenolysis ending at Glucose1 phosphate, showing the enzymes and coenzymes
    - State the metabolic fate of glucose 1 phosphate in liver and muscle justifying why only liver glycogen can contribute to blood glucose levels
    - Describe reciprocal hormonal and metabolite regulation of Glycogenesis and glycogenolysis and its difference between liver and muscle
    - Differentiate regulation of Glycogen metabolism in muscle and Liver
    - Discuss the metabolic defect, clinical symptoms and biochemical laboratory reports of a given glycogen storage disease

- **Glycolysis:**
    - Define glycolysis ,the cellular location of the glycolytic pathway and its end products in aerobic and anaerobic tissues and conditions
    - State the functions of glycolysis
    - Describe glycolysis as a common pathway for galactose and fructose metabolism and pinpoint the metabolic disorders causing fructose intolerance and galactosemias
    - Identify energy consuming steps of Glycolysis
    - Identify energy producing steps of Glycolysis
    - Describe the regulatory steps (irreversible steps) of glycolysis
    - Discuss the committed step of Glycolysis
    - Describe the Rapaport Lubering cycle, explain its importance in the oxygen carriage by hemoglobin
    - Describe the reversible steps of Glycolysis that facilitate Gluconeogenesis.
    - Count the NET minimum and maximum ATP gain from glycolysis in the aerobic and anaerobic conditions
- **Gluconeogenesis:**
    - Write the specific steps of gluconeogenesis
    - Count the NET minimum and maximum ATP gain from glycolysis in the aerobic and anaerobic conditions
    - Describe the metabolite flow from various pathways to initiate gluconeogenesis at different levels of glycolytic intermediates
    - Discuss the energetics of gluconeogenesis
    - List the metabolite and hormonal regulators of the rate of gluconeogenesis
- **HMP pathway:**
    - State cellular site of HMP shunt and locate the tissues most enriched in HMP shunt enzymes and their functions
    - Discuss the interrelationship of HMP shunt pathway with glucose metabolism, fat metabolism and nucleotide synthesis maintenance of the erythrocyte membrane integrity and drug metabolism
    - Explain the clinical outcome of primaquin treatment to malaria patients deficient in glucose 6 phosphate degydrogenase
      Name the regulatory steps of the HMP shunt pathway
    - Name the important products synthesized from the HMP shunt

- Describe the regulation of HMP shunt pathway

BI-3.4 Describe and discuss the regulation, functions and integration of carbohydrate along with associated diseases/disorders.

- Describe hormonal and metabolite regulations of glycolysis and reciprocal regulation of gluconeogenesis
- Differentiate the regulation of Glycolysis in Muscle and in Liver
- Explain and illustrate how does the carbohydrate metabolism play a central role in donating carbon skeleton to other metabolic pathways
- Describe how glucose 6 phosphate, triose phosphates, pyruvate , acetyl coenzyme a ,TCA cycle intermediates and HMP shunt intermediates are channelled to different metabolic pathways
- Discuss how are the above metabolites replenished by the pathways of amino acid and lipid metabolism
- Explain the manifestations of metabolic syndrome and diabetes mellitus as the outcome of interlinked deregulation of carbohydrate and lipid metabolism
- Appreciate NAD+/NADH,ATP/ADP,AMP and NADP/NADPH Ratios as the major determinant of metabolic regulations

BI-3.5 Describe and discuss the concept of TCA cycle as an amphibolic pathway and its regulation.

- Illustrate the of organization and function of the pyruvate dehydrogenase (PDH) complex, its reactants and products, cofactors, cellular localization, and tissue distribution and explain the concept and importance of multienzyme complex in metabolism
- The shuttle system to ensure availability of NAD+ in the mitochondria
- Name the intermediates of the TCA cycle and show the enzymatic steps involved in their formation
- Explain the location of TCA cycle as an amphibolic pathway appreciating its oxidative catabolic reactions with sequential degradative removal of CO_2,generation of NADH and a single step of substrate level phosphorylation generating GTP/ATP with the simultaneous generation of intermediates to be channeled for anabolic reactions
- Highlight the link of the TCA cycle with the urea cycle and heme synthesis
- Describe the anapleurotic reactions for the TCA cycle
- State the regulation of TCA cycle
- State the inborn error of TCA cycle and its clinical consequences in a tabular form.
- Count the total number of ATP molecules that can be generated from a molecule of glucose in combination with glycolysis, TCA cycle and ETC.

BI-3.6 Describe the common poisons that inhibit crucial enzymes of carbohydrate metabolism (eg; fluoride, arsenate)

- Write the reaction of glycolysis which is inhibited by arsenic and explain the mechanism of inhibition of the step
- Discuss the mechanism by which arsenic inhibits some other enzymes of carbohydrate and
- Lipid metabolism
- Explain how the energetic of glycolysis is disturbed by the Arsenate poisoning
- Explain how the inhibition of glycolysis at a single enzymatic step by arsenic can inhibit the whole pathway
- Explain the action of fluoride in inhibition of glycolysis specifying the reaction step & the application of the same in blood sample collection for estimation of blood glucose levels

BI-3.7 Discuss and interpret laboratory results of analytes associated with metabolism of carbohydrates

- Galactosemia:
    - Discuss the biochemical basis of Galactosemia and the metabolic alterations
    - Explain the clinical presentation of a child with galactosemia
    - Enumerate the diagnosis & management of children with galactosemia
    - Interpret a case report with blood/ urine lab findings in a child with Galactosemia.
    - To enumerate the biochemical basis of the inborn errors of fructose metabolism
    - List out the clinical/Lab findings in the disorders
    - Interpret a case/lab report of a child with fructose intolerance
- Mucopolysaccharidoses:
    - Define Mucopolysaccharides.
    - Name the mucopolysaccharides/Glycosaminoglycans, their locations and functions in our body.
    - Enumerate the Mucopolysaccharidoses, their biochemical defects and clinical presentations.
    - Interpret a case report of Mucopolysaccharidoses, with the given blood/urine lab findings.

BI-3.8 Discuss the mechanism and significance of blood glucose regulation in health and disease

- State the normal levels of blood glucose during fasting and fed states.
- Define hyperglycemia and hypoglycemia

- Define Discuss the metabolic and organ sources of glucose input to the blood
- Discuss the role of various organs for the removal of glucose from the blood and mechanism of glucose transport to adipose, muscle and brain specifying the transporters
- Explain the role of insulin, glucagon and other glucogenic hormones in regulating blood glucose level
- Discuss why regulation of blood glucose is vital for survival especially for the functioning of brain
- Discuss the significance of insulin independency of brain in uptake of glucose by it in contrast to the adipose and skeletal muscles
- Discuss the role of kidneys in generating glucose during starved states along with removal of ammonia
- Describe the regulation of blood glucose in the fed state and fasting state
- Define and classify Diabetes mellitus.
- Discuss the metabolic derangements in Diabetes mellitus

BI-3.9 Interpret the results of blood glucose levels and other laboratory investigations related to disorders of carbohydrate metabolism

- Glycemic status and control:
    - Name the common biochemical tests (blood/ urine) done in the laboratory to assess the glycaemic status of an individual.
    - State normal levels of fasting, postprandial, random blood glucose levels.
    - Define hyperglycemia & enumerate the causes.
    - Define hypoglycemia and state the causes.
- Glycated protein:
    - Define glycated Hemoglobin and the biochemical mechanisms involved in its formation.
    - State the normal serum HBA1C level and its changes in hyperglycemia.
    - Discuss the utility of measuring serum HbA1C levels as a tool in assessment of glycemic control, in patients with Diabetes Mellitus.
    - Enumerate the role of Fructosamines in the assessment of glycemic control
- GTT:
    - Define GTT and list out its types.
    - Describe the steps of OGTT procedure, along with the indications/ contraindications.
    - Tabulate the plasma glucose levels (OGTT)- in normal, impaired glucose tolerant & Diabetic individuals.
    - Discuss the indications, screening and diagnosis of Gestational Diabetes Mellitus based on OGTT (ADA criteria).
    - Interpret the OGTT reports, to get an impression about glycemic status of the patients.

    - Identify GDM based on the OGTT reports of pregnant women.
- Lab diagnosis of Diabetes Mellitus:
    - Define Diabetes Mellitus and enlist its types
    - Discuss the biochemical basis of Type I & type II Diabetes Mellitus.
    - Enumerate the ADA Diagnostic criteria (2010), of Diabetes Mellitus.
    - State the outline of management in Diabetes Mellitus.
    - Interpret the given laboratory blood /urine sugar report of a patient with Diabetes Mellitus
- Metabolic Syndrome:
    - Enumerate the characteristics of Metabolic syndrome and the clinical implications.
    - Enlist the criteria to diagnose Metabolic syndrome.
    - Interpret the case/Lab report of a patient presenting with Metabolic syndrome
- Diabetic ketoacidosis:
    - Enlist the acute and chronic complications of Diabetes Mellitus.
    - Define ketoacidosis and name its types.
    - Explain the biochemical basis and clinical presentation in Diabetic ketoacidosis.
    - Enumerate the laboratory findings, in a patient presenting with Diabetic ketoacidosis.
    - Interpret the blood/urine report of a patient with Diabetic ketoacidosis/starvation ketoacidosis.

BI-4 Chemistry and Metabolism of Lipids

BI-4.1 Describe and discuss main classes of lipids (Essential/non- essential fatty acids, cholesterol and hormonal steroids, triglycerides, major phospholipids and sphingolipids) relevant to human system and their major functions.

- Define & classify lipids.
- Explain simple lipids, compound & derived lipids with examples.
- Define Essential Fatty Acids, Enlist them with their biological functions & deficiency manifestations.
- Explain the role of PUFA.
- Describe composition of triglycerides with its important chemical properties in relation to its biological function.
- Explain the composition & biological significance of the various phospholipids.
- Differentiate between Plasmalogen & classical phospholipids.
- Explain the biochemical defect, clinical feature and diagnosis of RDS.
- Describe structure & functions of cholesterol.
- Describe functions of hormonal steroids (Vitamin D, Oestrogen, Progesterone, Testosterone, Glucocorticoids, Mineralocorticoids).

BI-4.2 Describe the processes involved in digestion and absorption of dietary lipids and also the key features of their metabolism

- Digestion and absorption of lipids:
    - List the various dietary lipids
    - Mention the sites and describe the role of various lipases & other enzymes, hormones and bile salts in lipid digestion
    - Explain the process and advantages of emulsification of fat and formation of micelles.
    - Mention the end product of digestion of lipids and their absorption
    - Explain how lipids are reassembled in the mucosal cell and transported into lymphatics and blood vessels.
    - Define steatorrhea, mention its causes and explain the biochemical tests that help in the differential diagnosis of steatorrhea.
- Fatty Acid Oxidation:
    - Explain how the body mobilises depot fat from adipose tissue for energy, role of hormone sensitive lipase and the factors regulating it.
    - Mention the various types of fatty acid oxidation along with the organelles involved
    - Describe the role of carnitine in fatty acid oxidation
    - Explain why small and medium chain fatty acids can be oxidised in carnitine deficiency
    - Describe in detail how long chain fatty acid like palmitic acid are oxidised for energy by the body along with factors regulating the same.
    - Explain the high energy yield from oxidation of one palmitic acid
    - Differentiate between the different types of oxidation of fatty acids
    - Mention the products of odd chain fatty acid oxidation and explain their fate
    - Discuss the biochemical findings and clinical features of disease conditions due to impaired fatty acid oxidation
- Fatty Acid Synthesis:
    - Outline the synthesis of palmitic acid in the body.
    - Enumerate the organization, components & mechanism of fatty acid synthase complex.
    - Mention the advantages of the FAS complex in the body. Differentiate Multifunctional Enzyme vs Multienzyme Complex with an example of each one.
    - Describe the role of desaturase in unsaturated fatty acid synthesis.
    - Describe the role of chain elongation system involved in fatty acid synthesis
    - Explain why essential fatty acids cannot be synthesised by the body

- Differentiate between beta oxidation and synthesis of fatty acid
- Discuss reciprocal regulation of fatty acid synthesis & oxidation.

- Ketone Bodies Metabolism:
  - Name the different ketone bodies & their Importance
  - Mention the site & steps of ketone bodies synthesis (ketogenesis).
  - Mention the organs that utilize ketone bodies & explain the steps involved in their utilization (ketolysis)
  - Define the terms: ketonemia, ketonuria and ketosis
  - Explain the regulation of ketone body metabolism.
  - Explain the biochemical basis for signs & symptoms of ketoacidosis
  - Mention the causes for ketosis
  - Discuss the laboratory methods to detect the ketone bodies in urine
- Cholesterol Metabolism:
  - Mention the biological importance of cholesterol in the body
  - Mention the organ & subcellular location of cholesterol biosynthesis
  - Describe the biosynthesis of cholesterol from acetyl CoA to Mevalonate.
  - Discuss the role of HMG-CoA reductase in regulation of cholesterol synthesis
  - Mention the short term & long term regulation of cholesterol biosynthesis in the body
  - Describe the mechanism of action of various drugs used to lower blood cholesterol levels
  - Summarize the metabolic fate of cholesterol in body
  - Explain the formation of bile acids (primary & secondary) & bile salts as the breakdown product of cholesterol metabolism & its enterohepatic circulation
- Complex Lipid Metabolism:
  - Explain how different phospholipids can be synthesized from triglycerides.
  - Discuss the role of various phospholipase in degradation of lecithin.
  - Mention the lipid storage disorders & biochemical defect associated with them.
- Triglyceride metabolism:
  - Mention the site & list the substrates required for the synthesis of Triglyceride.
  - Describe the synthesis of Triglyceride.
  - Describe the degradation of Triglyceride.

- Fatty Liver and Lipotropic Factors:
    - Define fatty liver and discuss the various causes of fatty liver
    - Outline the progression and consequence of fatty liver
    - Differentiate between alcoholic and non alcoholic steatohepatitis
    - Describe the role of various lipotropic factors in fatty liver.

BI-4.3 Describe the structure and functions of lipoproteins, their functions, interrelations & relations with atherosclerosis; Explain the regulation of lipoprotein metabolism & associated disorders.

- Describe the structure, composition & function of various lipoproteins.
- Enlist the lipoproteins & state the major lipid & protein component in each with their relative proportion by weight.
- Classify the lipoproteins based on separation and electrophoretic technique.
- Describe the formation, cellular uptake and fate of chylomicrons.
- Describe the formation, cellular uptake and fate of VLDL & LDL with emphasis on receptor mediated endocytosis.
- Describe the formation, cellular uptake and fate of HDL.
- Explain the role of various apolipoproteins in the metabolism of lipoproteins
- Explain the function and significance of CETP, LCAT and ACAT in the metabolism of lipoproteins.
- Explain the role of lipoprotein lipase.
- Classify hypo and hyper lipoproteinemia based on Frederickson's criteria. Mention the biochemical defects associated with the lab findings.
- Define Atherosclerosis. Explain the role of lipids in atherogenesis. (OxLDL, Lp (a), small dense LDL, HDL) & mention its important markers.
- Identify the modifiable and non-modifiable risk factors associated with CVD.

BI-4.4 Interpret laboratory results of analytes associated with metabolism of lipids.

- Explain the various components of Lipid Profile.
- List the Biological Reference Interval of the Total Cholesterol, HDL-C, LDL-C, VLDL-C & Triglyceride as per the current NCEP guideline.
- Discuss the importance of Total Cholesterol:HDL-C & LDL-C:HDL-C Ratios.
- Enumerate different lipid and non-lipid biochemical markers of Ischaemic Heart Disease.

- Interpret the lipid profile & apolipoprotein analysis and mention the type of lipoprotein disorders.
- Mention other specific biochemical analytes associated with defects of lipid metabolism (MCAD, Propionyl CoA Carboxylase Deficiency, Organic Aciduria)
- Describe the biochemical picture of human plasma / serum in Metabolic Syndrome.

BI-4.6 Describe the therapeutic uses of prostaglandins and inhibitors of eicosanoid synthesis

- Define Eicosanoids & discuss the source of prostaglandins, prostacyclins, thromboxanes & leukotrienes.
- Describe the mechanism of action of Prostaglandins & Thromboxanes.
- Compare & contrast the biological actions of various prostaglandins.
- Discuss the therapeutic applications of Prostaglandins
- Describe the inhibitors of Cyclooxygenase Enzymes & their clinical application.
- Mention the biological importance of thromboxanes & leukotrienes

BI-5 Chemistry and Metabolism of Proteins

BI-5.1 Chemistry and properties of amino acids

- Define an amino acid with its basic structure.
- Classify amino acids based on structure and polarity with examples.
- Differentiate and enumerate the nutritionally essential and non-essential amino acids.
- Enumerate the aromatic amino acids, sulfur containing amino acids and branched chain amin oacids.
- Describe Isoelectric pH and its application.
- Discuss the properties of amino acids in relation to their diagnostic applications and clinical importance.
- Describe peptide bond and its role in protein formation
- Describe structural organization of proteins
- Describe the primary, secondary, tertiary and quaternary structure of proteins
- Describe the bonds stabilizing protein structure and protein folding
- Describe process of denaturation and its application
- List the methods to determine primary, secondary, tertiary and quaternary structure of protein
- Enlist the protein misfolding disorders.

- List the Practical/Clinical Applications of studying proteomics and its relation to Human genome project

BI-5.2 Describe & discuss functions of proteins and structure function relationship in relevant areas, for example hemoglobin & selected hemoglobinopathies.

- Protein structure and function relationship:
    - Differentiate between simple, conjugated and complex proteins by giving suitable examples.
    - Name the proteins that get separated as alpha 1, alpha 2 & beta globulins by electrophoresis.
    - Identify normal and abnormal plasma protein electrophoresis patterns.
    - Differentiate plasma proteins based upon their functions.
    - Enlist all functions of Albumin.
    - Explain the clinical feature of edema in hypoalbuminemia.
    - Explain role of intra & inter chain disulfide bonds in making protein functionally enable by giving suitable examples.
    - Describe role of glycine with respect to structure and function of collagen type I.
    - Describe the buffering capacity of albumin & haemoglobin due to presence of many histidine residues.
    - Explain the role of proximal and distal histidine in stabilizing oxy haemoglobin structure.
    - Differentiate structurally between foetal Hb & adult Hb in context to oxygen transfer from mother to foetus.
    - Discuss the role of Myoglobin as oxygen reservoir.
    - Correlate the change in specific amino acid to
        - Sickled Hb
        - Unstable Hb in Hb Zurich
        - Cyanosis in Hb M Boston
        - Compensatory erythrocytosis in Hb Bethesda
        - Physiological anemia in Hb Hope

BI-5.3 Describe the digestion and absorption of dietary protein.

- Describe the digestion of proteins by action of proteolytic enzymes in different parts of GIT.

- Define a zymogen. Justify the secretion of proteolytic enzymes as zymogens.
- Describe the process of absorption of peptides and free amino acids.
- Enlist the transporters and mechanisms of amino acid absorption including Meister cycle.
- Mention the clinical disorders associated with the protein digestion and absorption.
- Explain amino acid pool as dynamic steady state.
- Differentiate the nitrogen balance in health, disease and convalescence period.

BI-5.4 Describe common disorders associated with protein metabolism

- Transamination, Deamination, Ammonia metabolism:
    - Explain how the process of protein synthesis and degradation relate to amino acid metabolism.
    - Define and describe the mechanism of transamination and deamination.
    - Explain the clinical significance of reaction of AST, ALT and glutamate dehydrogenase.
    - Justify amino acid glutamate acts as a central molecule in ammonia metabolism.
    - Describe the metabolism of ammonia – sources, storage, function, transport, disposal and its toxicity.
    - Enumerate the causes, clinical features and treatment options of hyperammonemia.
    - Describe the biochemical basics of hyperammonemia in hepatic encephalopathy & urea cycle defects.
- Urea cycle:
    - Enumerate the steps of biosynthesis of urea in different stages.
    - Justify man adapted to be ureotelic compared to other aquatic animals and birds.
    - Define and outline 5 metabolic steps of the urea cycle.
    - Describe the other names, salient features, biochemical pathway (rate limiting steps) energetics and regulation.
    - Justify the cellular compartmentation of urea cycle
    - Explain the metabolic link between urea and TCA cycle and its clinical significance.
    - Explain the metabolic link with gluconeogenesis, polyamine synthesis and de novo arginine synthesis.
    - Enumerate the urea cycle disorders and the defective enzymes.

- Explain the metabolic consequence, clinical features, investigations and management principles with examples of Hyperammonemia Type II.
- Enumerate three common causes of pre-renal, renal and post-renal causes leading to uremia.

- Glycine Metabolism:
  - Enumerate the reactions by which glycine is synthesized and catabolized.
  - Mention the role of glycine cleavage system.
  - Enlist the biologically important compounds derived from glycine.
  - Describe the steps by which creatinine is synthesized from glycine.
  - Explain about clinical significance of creatinine.
  - Describe the synthesis of other biologically important compounds derived from glycine and their functions.
  - Enlist the inborn errors of glycine metabolism, their enzyme defects, clinical features, various lab tests available for diagnosis.
  - Explain the relationship between metabolic error in glycine metabolism with urolithiasis.
- Aromatic amino acids: Phenylalanine & Tyrosine:
  - Enlist the aromatic amino acids.
  - Describe the metabolism of tyrosine along with the enzymes and coenzymes.
  - Justify " Tyrosine is nonessential amino acid".
  - Enlist the biologically important compounds synthesized from tyrosine.
  - Elaborate on the metabolic role of tyrosine with regards to: Formation of thyroid hormones, catecholamines and melanin.
  - Enlist the inherited disorders associated with phenylalanine and tyrosine metabolism.
  - Differentiate between various types of phenylketonuria based on the enzyme defects.
  - Describe the inherited disorders, specific enzyme which is deficient and clinical presentation.
  - Differentiate between albinism and vitiligo.
  - Enlist the tests done for IEM diagnosis, specifically PKU and alkaptonuria.
  - Consequences of non availability of terahydrobiopterin in connection to aromatic aminoacid metabolism.
  - Reason out how copper deficiency is associated with disorders of pigmentation.
  - Justify " Aspartame is Contraindicated in PKU".

- Significance of dietary advise in PKU.

- Tryptophan Metabolism:
  - Discuss the pathways of tryptophan metabolism along with their biochemical significance.
  - Explain the effect of B-6 deficiency on tryptophan metabolism and mention the clinical consequences associated.
  - State different steps of serotonin pathway and also mention the role of monoamine oxidase inhibitors and depressants.
  - Discuss the role of melatonin in human body.
  - What is malignant carcinoid syndrome. State a biochemical laboratory investigation for its diagnosis.
  - Explain underlying etiology, clinical features and treatment associated with serotonin syndrome.
  - Enlist the disorders of tryptophan metabolism.
- Sulphur containing amino acid metabolism:
  - Enlist the Sulphur Containing amino acids.
  - Differentiate between cysteine and cystine.
  - Justify why cysteine is a non essential amino acid.
  - Describe the metabolism of Methionine.
  - Explain the biosignificance of SAM and give examples of transmethylation reactions.
  - Role of SAM in protecting DNA from digestion by restriction enzymes.
  - Explain the link between homocysteine and heart disease
  - Explain the role of vitamins(B12, B6, THFA) in the maintenance of serum homocysteine levels in desirable limits.
  - Give example for transsulphuration reaction.
  - Biosynthesis and degradation of Cysteine
  - Enlist all biomolecules synthesized from cysteine & describe their biological significance:(ie Glutathione, Taurine, PAPS)
  - Name the IEM of sulphur Containing aminoacids.
  - Describe the inherited disorders, specific enzyme which is deficient and clinical presentation.
- Branched chain amino acid Metabolism:
  - Enlist the Branched chain amino acids.

- Discuss the pathways of BCAA metabolism along with their biochemical significance.
- Name the IEM of Branched chain amino acids.
- Describe the inherited disorder: MSUD, Types, specific enzyme which is deficient and clinical presentation.
- Reason for the burnt sugar smell of urine in MSUD.
- Justify "Early neonatal screening for IEM is essential in MSUD suspect"

- Polyamines, Basic Amino acids, Other amino acids:
  - Enlist the basic amino acids.
  - Describe the formation of nitric oxide.
  - Name the types of nitric oxide synthase and enumerate its functions.
  - Enlist the utility of nitric oxide as a pharmacologic modality.
  - Enumerate the polyamines and their function
  - Describe the metabolism of polyamines and their clinical significance
  - Describe synthesis and biological functions of histamine.
  - Enlist various biogenic amines formed from amino acids and enumerate their biological functions.

BI-5.5 Interpret laboratory results of analytes associated with metabolism of proteins.

- Explain the importance of interpreting lab results of analytes.
- Tabulate various deranged analyte associated with protein metabolism disorders
- Explain and correlate the biochemical lab results in the clinical context of deranged protein metabolism.
- Enlist the diagnostics techniques available at advanced biochemical laboratory for IEM.
- Enlist the biochemical tests of blood/urine analytes recommended for the diagnosis of IEM:
  - PKU
  - MSUD
  - Alkaptonuria
  - Tyrosinemia
  - Hartnup disease
  - Homocystinuria

- Cystinuria

BI-6 Metabolism and homeostasis

BI-6.1 Discuss the metabolic processes that take place in specific organs in the body in the fed and fasting states

- Define the purpose of metabolism: in obtaining chemical energy, synthesizing macromolecules required for specialized functions
- Enumerate the three types of metabolic pathways: Describe the catabolic, anabolic and amphibolic pathways with examples
- Describe the stages of metabolism: Explain the degradation of foodstuffs involving primary metabolism, secondary or intermediary metabolism, transport of reduced equivalents through electron transport chain
- Discuss the metabolic profile under well fed state: Overview of nutrients absorption from intestine into blood and uptake by tissues, the enzymes activated and inhibited in well fed state
- Discuss the metabolic adaptations during fasting and starvation: Describe the stages of metabolic adaptations such as glycogenolysis, gluconeogenesis and lipolysis, enzymes activated and inhibited during fasting
- Discuss the metabolic profile of brain, cardiac muscle, liver, skeletal muscle and adipose tissue: Explain the energy consumption depending on function and mass of organs, the major fuels for the organs in fasting and starvation

BI-6.2 Describe and discuss the metabolic processes in which nucleotides are involved

- Chemistry of Nucleotides:
    - Identify the purine bases and their derivatives
    - Identify the pyrimidine bases and their derivatives
    - Identify the structure and types of Nucleosides and Nucleotides, deoxynucleotides, cyclic nucleotides
    - Discuss the functions of nucleotides and their derivatives, analogues of nucleotides, uses of nucleotide analogues in medicine
- Metabolism of purine nucleotides:

- Enumerate the sources of heteroatoms of purine ring
- Describe the De novo synthesis of purine nucleotides-(first two steps)
- Explain the formation of AMP and GMP from IMP
- Describe the Salvage Pathway of purine nucleotides with its significance
- Discuss the conversion of nucleoside monophosphates to diphosphates and triphosphates
- Discuss the Conversion of ribonucleotides to deoxyribonucleotides
- Explain the regulation of purine biosynthesis. Inhibitors of purine biosynthesis
- Describe the catabolism of purines. Rate limiting step.
- Enumerate the sources of heteroatoms of pyrimidine ring
- Describe the De novo synthesis of pyrimidines nucleotides
- Discuss the synthesis of Deoxyribonucleotides
- Explain the Regulation of pyrimidine synthesis
- Mention the inhibitors of pyrimidine synthesis (anticancer drugs).
- Mention the end products of catabolism of pyrimidine nucleotides

BI-6.3 Describe the common disorders of Nucleotide Metabolism

- Enumerate the disorders associated with Purine and Pyrimidine Metabolism
- Mention the reference range for Serum uric acid (K). Define Hyperuricemia and discuss the biochemical basis behind disorders associated with Hyperuricemia
- Discuss Gout, with reference to its types, causes, clinical features, biochemical basis, laboratory evaluation, treatment and complications
- Describe Lesch Nyhan Syndrome, with reference to the enzyme deficiency/ genetic defect, mode of inheritance, clinical features, biochemical basis, laboratory evaluation, treatment and prognosis
- Discuss Severe Combined Immune Deficiency (SCID) / ADA deficiency disorder, with reference to its genetic defect, mode of inheritance, biochemical basis, clinical manifestations, laboratory evaluation, treatment and prognosis

- Discuss the scope and trials of gene therapy for SCID
- Describe Orotic Aciduria, with reference to the enzyme deficiency, biochemical basis, clinical manifestations, laboratory evaluation, treatment & prognosis
- Describe Hypouricemia with respect to its causes, clinical manifestations, biochemical basis, laboratory evaluation and treatment
- Justify the rationale behind the biochemical tests for the diagnosis of the disorders of Nucleotide metabolism through appropriate reasoning

BI-6.4 Discuss the laboratory results of analytes associated with gout & Lesch Nyhan syndrome.

- State the normal reference range of serum and urinary uric acid in males and females
- Define hyperuricemia and enumerate its causes
- Explain the biochemical basis of Gout
- Explain the biochemical basis of Lesch Nyhan syndrome
- Interpret the lab results of a patient suspected of having gout /gouty arthritis
- Interpret the lab results of a patient suspected of having Lesch Nyhan syndrome

BI-6.5.a Describe the biochemical role of fat soluble vitamins in the body and explain the manifestations of their deficiency.

- Define Vitamins
- Know classification of vitamins with examples
- Vitamin A: Describe
    - Biochemistry (Types & Synthesis), Sources, RDA
    - Biochemical Functions (Role in vision, wald's visual cycle)
    - Use as antioxidant
    - Deficiency Manifestations & Toxicity Effects
- Vitamin D: Describe
    - Biochemistry (Synthesis & Activation), Sources, RDA
    - Biochemical Functions (action on intestine, bone & kidney)
    - Deficiency Diseases (Rickets & Osteomalacia) & Toxicity Effects
- Vitamin E: Describe
    - Biochemistry, Sources, RDA
    - Biochemical Functions
    - Deficiency Diseases
- Vitamin K: Describe
    - Sources, RDA
    - Biochemical Functions & Vitamin K Cycle
    - Deficiency Manifestations

BI-6.5.b Describe the biochemical role of vitamins in the body and explain the manifestations of their deficiency.

- Vitamin C:
    - Mention the sources, chemical nature and requirement.
    - Describe the biochemical functions in detail, deficiency disorders and therapeutic uses.
- Thiamine:
    - Mention the sources, chemical nature and requirement.
    - Describe the coenzyme forms, biochemical functions, absorption, deficiency disorders, therapeutic uses and antagonists.
- Riboflavin:
    - Mention the sources, chemical nature and requirement.
    - Describe the coenzyme forms, biochemical functions, deficiency disorders and antagonists.
- Niacin:
    - Mention the sources, chemical nature and requirement.
    - Describe the coenzyme forms, biochemical functions, synthesis, absorption, therapeutic uses and deficiency disorders.
    - Briefly emphasize on the relationship with Tryptophan.
- Pantothenic Acid:
    - Mention the sources, chemical nature and requirement.
    - Describe the coenzyme forms, biochemical functions, requirement and deficiency disorders.
- Pyridoxine:
    - Mention the sources, chemical nature and requirement.
    - Describe the coenzyme forms, biochemical functions, absorption, requirement, deficiency disorders and antagonists.
- Folic Acid:
    - Mention the sources, chemical nature and requirement.
    - Describe the coenzyme forms, biochemical functions, absorption, requirement, deficiency disorders, therapeutic doses and antagonists.
    - Discuss the interrelationship between Folic acid and vitamin B12.

- Describe and emphasise the involvement of folic acid in one carbon metabolism.

- Vitamin B12:
  - Mention the sources, chemical nature and requirement.
  - Describe the coenzyme forms, biochemical functions, absorption, requirement, deficiency disorders, therapeutic doses and antagonists.
  - To reinforce the interrelationship between Folic acid and vitamin B12.

- Biotin:
  - Mention the sources, chemical nature and requirement.
  - Describe the coenzyme forms, biochemical functions, absorption, requirement, deficiency disorders and antagonists.

- Describe in brief the vitamin like substances and their functions. (eg: Choline, lipoic acid)

BI-6.6 Describe the biochemical processes involved in generation of energy in cells.

- Define cellular respiration
- Define substrate level and oxidative phosphorylation with examples
- Define high energy compounds with examples
- Describe the organisation, components and flow of electrons in electron transport chain
- Explain the chemiosmotic theory
- Describe the synthesis of ATP by ATP synthase
- Explain the regulation of ATP synthesis by oxidative phosphorylation
- Explain the inhibitors of electron transport chain
- Explain the inhibitors of oxidative phosphorylation
- Define uncouplers with examples
- Describe the role of brown adipose tissue in thermogenesis.

BI-6.7 & 6.8 Describe the processes involved in maintenance of normal pH, water & electrolyte balance of body fluids and the derangements associated with these.

Discuss and interpret results of Arterial Blood Gas (ABG) analysis in various disorders

- Define the terms acid, base, strong acid/base, weak acid/base.
- Define the terms pH, pKa and buffer
- Describe Henderson Hasselbalch equation and it's application
- Describe mechanism of action of buffer

- Enlist various acids and bases produced in the body.
- Describe mechanism of regulation of blood pH by blood buffer systems with respect to composition, ratio, reaction to acid or base addition, advantages and disadvantages
- Explain the biochemical changes in the bicarbonate buffer system in acidosis and alkalosis with the help of Henderson Hasselbalch equation
- Describe the role of respiratory system in regulation of blood pH with respect to role of respiratory centre, isohydric transport of CO2 and chloride shift.
- Describe the renal mechanism in regulation of blood pH with respect to H+ excretion, ammonium ion excretion, PO4 buffer, bicarbonate ratio, reaction to acid or base reabsorption
- Distinguish the acid-base disorders as acidosis and alkalosis with a note on normal reference ranges of pH, pCO2, pO2 and bicarbonate.
- Describe anion gap, differentiate between high anion gap and normal anion gap metabolic acidosis and their clinical importance.
- Discuss the causes and clinical features of Respiratory acidosis/alkalosis and Metabolic acidosis/alkalosis and the compensatory mechanism (Nesting with Medicine).
- List the important components (pH, pO2,pCo2, HCO3, SO2) of an ABG report and state their reference range.
- Enlist other biochemical investigations to be done in the diagnosis of various types of acidosis and alkalosis
- Analyse and interpret the ABG report for respiratory and metabolic acidosis/alkalosis and briefly state the corrective measures.
- Explain role of various hormones in maintaining water electrolyte homeostasis (Physiology PY7.5)
- Describe the distribution of water and electrolytes in different compartments of the body.
- Explain the concept of osmolarity and osmolality and the factors affecting the osmolality in ECF and ICF
- Explain hypernatremia and hyponatremia with respect to causes, biochemical basis of clinical features, complications and management modalities
- Explain hyperkalemia and hypokalemia with respect to causes, biochemical basis of clinical features, complications and management modalities
- Explain hyperchloremia and hypochloremia with respect to causes, biochemical basis of clinical features, complications and management modalities (Nesting with Medicine)
- Describe dehydration with respect to the causes, biochemical basis of clinical features, complications and management modalities

- Describe water intoxication with respect to causes, biochemical basis of clinical features, complications and management modalities

BI-6.9 & 6.10 Describe the functions of various minerals in the body, their metabolism and homeostasis.

Enumerate and describe the disorders associated with mineral metabolism.

- Differentiate between principal elements and trace elements with examples.
- State the distribution, dietary source and requirement of principal and trace elements in the body
- Discuss the absorption of minerals in the body with special reference to calcium and iron
- Describe the biochemical functions of calcium and phosphorus.
- Explain the homeostasis of blood calcium level.
- Enumerate the causes and clinical findings of hypocalcemia and hypercalcemia.
- Mention the disorders of bone mineralization and list the biochemical markers of bone diseases.
- List the causes and features of hyperphosphatemia and hypophosphatemia.
- List the causes and features of hypermagnesemia and hypomagnesemia.
- Discuss the biochemical functions of sulphur.
- Describe the biochemical function, cellular regulation of absorption, transport and storage of iron in the body.
- Discuss the causes and features of iron deficiency anaemia.
- List the features of iron toxicity.
- List the tests used in laboratory evaluation of iron status and the treatment of iron deficiency.
- Explain the biochemical functions of trace elements (Cu,I, F, Se,Zn, Mn, Mo, Co,Ni, Cr) in the body.
- Explain the potential impact of zinc supplementation in conditions like diarrhoea etc. with respect to COVID 19.
- Describe the manifestations of zinc deficiency.
- Discuss the causes and features of abnormality in copper metabolism.
- Enumerate the features of selenium deficiency and toxicity.
- Describe the causes and features of fluorosis.

BI-6.11 Describe the functions of haem in the body and describe the processes involved in its metabolism and describe porphyrin metabolism

- Enumerate important heme containing proteins
- Describe the steps of heme biosynthesis with special emphasis on coenzymes and their regulation.
- Define Porphyria and Discuss Acute intermittent porphyria in terms of clinical manifestations and laboratory findings
- Explain breakdown of heme and transport, conjugation and excretion of bilirubin in the body.
- State the reference range of total, conjugated and unconjugated bilirubin
- Define and Classify Hyperbilirubinemia with their clinical significance.
- Classify the types of Jaundice and enumerate their differential diagnosis.

BI-6.12 Describe the major types of hemoglobin and its derivatives found in the body and their physiological/ pathological relevance

- Describe the structural and functional characteristics of the normal and abnormal haemoglobins.
- Enumerate the functions of haemoglobin.
- Explain the functions of haemoglobin (oxy and deoxyhaemoglobin).
- Explain the chloride shift and Bohr's effect
- Describe the effect of pH, CO2 level, 2,3 bisphosphoglycerate, sickle cell Hb and foetal Hb on Hb oxygen dissociation curve.
- Explain the molecular basis, diagnosis and management of hemoglobinopathies (SCD & Thalassemia).
- Enumerate different types of Hb derivatives and describe the characteristic features of carboxy-Hb, carbamino-Hb, meth-Hb and sulf-Hb

BI-6.13 & 6.14 Describe the functions of the kidney, liver, thyroid and adrenal glands.

Describe the tests that are commonly done in clinical practice to assess the functions of these organs (kidney, liver, thyroid and adrenal glands)

- Renal Function Test:
    - Describe the glomerular, tubular and extrarenal functions of Kidney
    - Classify and enumerate Renal Function tests and discuss the tests with normal values.
    - Describe the renal function tests based on glomerular, tubular function and urine analysis.

- Analyze and interpret the renal function tests with respect to diseases like renal failure, proteinuria, nephrotic syndrome, Glomerulonephritis etc

- Liver Function Test:
  - Describe the synthetic, metabolic, detoxification and excretory functions of Liver
  - Classify the liver function tests based on the functions of liver and discuss the tests with normal values.
  - Differentiate the different types of Jaundice based on biochemical tests.
  - Analyze and Interpret liver function tests with respect to Prehepatic, Hepatic, and Posthepatic Jaundice.
- Thyroid Function Test:
  - Describe the functions of Thyroid gland
  - Discuss the thyroid function tests with normal values (ie) TSH, T3, T4, FT3, FT4.
  - Analyze and interpret the thyroid function tests with respect to Hypothyroidism and Hyperthyroidism.
- Adrenal Function Test:
  - Describe the functions of adrenal gland
  - Describe the adrenal function tests in terms of adrenal cortical hormones with clinical significance (ACTH, Cortisol, Suppression/Stimulation tests etc.)

BI-7 Molecular biology

BI7.1.1-Describe the structure of DNA with a suitable diagram

- Describe the structure of DNA with a suitable diagram
- Enumerate the functions of DNA
- Describe denaturation and renaturation of DNA
- Enumerate the various types of RNA
- Describe the structure and functions of different types of RNA
- Explain the phases of cell cycle with a suitable diagram
- Explain the regulation of cell cycle

BI7.2-Describe the processes involved in replication & repair of DNA and the transcription & translation mechanisms

- Define DNA replication
- Describe Meselson-Stahl experiment to infer semiconservative replication of DNA.
- Enumerate and describe the steps of DNA replication
- List DNA polymerases in prokaryotes and eukaryotes
- Compare replication process in prokaryotic and eukaryotic cells.
- Label the different stages and enzymes involved in DNA replication with the help of diagram.
- Enumerate/list inhibitors of DNA replication and enzymes inhibited by inhibitors
- List DNA damage processes and describe various DNA repair mechanisms
- Enumerate diseases associated with DNA repair and type of repair mechanism involved
- Define telomere and telomerase and mention its clinical significance
- Define transcription
- List/enumerate types of RNA polymerase and their functions.
- Enumerate and describe the steps of transcription.
- Enumerate and describe various post transcriptional processes
- Define Snurps
- Define spliceosomes
- Define ribozyme
- Enumerate/list inhibitors of RNA synthesis and their mode of action
- Relate reverse transcriptase enzyme in HIV.
- Describe RNA interference and its clinical significance.
- Define genetic code and describe its salient features
- Define translation.
- Enumerate and describe the steps of translation
- Define polysomes.
- Describe protein targeting and mention the associated disorders.
- Enumerate various post translational processes.
- Enumerate/list the inhibitors of protein synthesis and their mode of action
- Compare translation process in Prokaryotic and Eukaryotic cells
- Describe the inheritance of mitochondrial DNA and associated disorders

BI 7.3 Describe gene mutations and basic mechanism of regulation of gene expression

- Explain gene mutation.
- Explain various types of mutations and their effects.
- Discuss induction and repression of gene expression.
- Explain the concept of housekeeping and regulatory genes.
- Enumerate the various covalent modifications occurring in histones which regulate gene expression.
- Describe the role of motifs in gene expression.
- Explain the concept of lac operon with the help of a labelled diagram.
- Discuss the gene regulation in eukaryotes at the level of DNA
- Describe how the genes are regulated in eukaryotes at the level of RNA
- Describe the gene regulation in eukaryotes at the level of protein.

BI 7.4- Describe applications of molecular technologies like recombinant DNA technology, PCR in the diagnosis and treatment of diseases with genetic basis.

- Describe the principles of gene cloning with applications of restriction endonucleases, vectors.
- Enumerate the applications of recombinant DNA, genomic and cDNA library
- Describe the basis of gene therapy and antisense therapy
- Describe the principles and applications of techniques like PCR , Western, Southern and Northern Blotting, DNA Finger printing, RFLP, VNTRs, Microarray, DNA hybridization techniques, FISH

BI 7.5 Describe the role of xenobiotics in disease.

- Define xenobiotics.
- Describe the phase concepts of detoxification.
- Explain the Phase I detoxification reaction with suitable examples.
- Describe the Phase II detoxification reaction with suitable examples.
- Describe in detail various types of conjugation reactions.
- Discuss the biomedical importance of mono-oxygenase Cyt P450 system in detoxification.
- Explain the mechanism of detoxification of drugs used in treatment and prevention of diseases
- Explain pharmacological significance of detoxification mechanism with suitable examples.

BI 7.6- Describe the anti-oxidant defence systems in the body.

- Enumerate the various types of antioxidants with examples.
- Explain the role of antioxidants in free radical scavenging with a suitable diagram.
- Describe the mechanism of antioxidant defence systems in the body with a diagram.
- Explain the importance of antioxidants in the prevention of oxidative stress with suitable examples

BI 7.7- Describe the role of oxidative stress in the pathogenesis of conditions such as cancer, complications of diabetes mellitus and atherosclerosis

- Define reactive oxygen species (ROS).
- Describe the sources of free radicals in the body.
- Explain the mechanism of lipid peroxidation
- Define oxidative stress.
- Explain the free radical damage causing mutation, cancer, complications of diabetes mellitus and atherosclerosis.

BI-8 Nutrition

BI-8.1 & 8.5 Discuss the importance of various dietary components and explain importance of Dietary fibre.
Summarize the Nutritional importance of commonly used items of food including fruits and vegetables (macro molecules and its importance)

- Identify key macronutrients and micronutrients of diet
- Define calorific value of food and list the calorific value of carbohydrate, protein and fat.
- Define Respiratory Quotient & list the RQ of carbohydrate, fat, protein and mixed diet.
- Define Basal Metabolic rate, list the factors affecting BMR, different types of measurements of BMR and normal value of BMR.
- Define Specific Dynamic Action (SDA). Enumerate SDA for Carbohydrates, proteins, fats and mixed diet.
- List the different types of physical activity and discuss the energy requirement of different physical activity
- Explain the steps for calculation of energy requirement for different physical activity
- Discuss the major dietary carbohydrates with their clinical significance.
- Describe glycaemic index with reference meal as 50 grams of glucose and list the glycaemic index of common foods.
- Define dietary fibre and their requirement per day.
- Explain clinical importance of dietary fibres with examples
- List the sources, different types of dietary fat, recommended daily intake and nutritional importance of lipids.
- List the different sources of dietary cholesterol and its clinical importance.
- Discuss the importance of essential fatty acids, PUFA and trans fat with suitable examples
- List the sources, recommended daily intake of dietary proteins and nutritional importance of proteins.
- Define nitrogen balance and enumerate their types.
- Enumerate the factors affecting nitrogen balance & maintenance of Nitrogen balance.

- List the indices used to assess the nutritional value of protein and add a note on amino acid score.
- Discuss the about the essential, limiting amino acids and mutual supplementation of proteins.
- List the common food items of Indian population and their ratio in diet
- Discuss the nutritional value of cereals and pulses as major food items in Indian population.
- Discuss the relevance or importance of mutual supplementation of cereals and pulses.
- Explain why milk is a complete protein.
- Explain why egg is the reference protein.
- Discuss the nutritional importance of fruits and vegetables.
- Discuss the role of water as an essential nutrient of life.

BI-8.2 Describe the types and causes of Protein Energy Malnutrition and its effects

- At the end of the T-L session, the Phase 1 MBBS students shall be able to:
- Classify protein energy malnutrition
- Enumerate the causes for protein energy malnutrition.
- Discuss the aetiology & biochemical basis for manifestations observed in Kwashiorkor and Marasmus
- Differentiate between Kwashiorkor and Marasmus with respect to clinical features, laboratory findings & management.
- Define & list the causes of cachexia due to diseases

BI-8.3 Provide dietary advice for optimal health in childhood and adults and in disease conditions like Diabetes Mellitus, coronary artery disease and in pregnancy

- At the end of the T-L session, the Phase 1 MBBS students shall be able to:
- Name three methods for assessment of nutritional quality of proteins
- Define a balanced diet and enumerate the dietary proximate principles and their importance.
- Discuss the general principles of prescribing a diet based on calorie requirement, proximate principles, general composition of food & determine the items of food.
- Plan a balanced diet with sufficient calories for healthy adult & child considering age, sex, body weight, physical activity, food habits, local availability of food items and socio-economic status etc.
- Describe the different steps of prescribing the diet for patient with respect to glycaemic index and add a note on dietary guidelines to be followed by the diabetic patient
- Describe the different steps of prescribing the diet for coronary artery disease patient considering age, sex, body weight, food habits, local availability of food items, socio economic status, treatment history etc.
- Describe the different steps of prescribing the diet with sufficient calories for pregnant lady.

BI-8.4 Describe the causes (including dietary habits), effects and health risks associated with being over weight or obese.

- At the end of the T-L session, the Phase 1 MBBS students shall be able to:
- Define obesity & classify obesity based on BMI and Body fat distribution.
- List the causes for over weight and obesity including genetic cause for obesity.
- Discuss about physiological regulators of appetite.
- Enumerate the health consequences of obesity in adults and children.
- Identify the psychological causes for weight disturbances.
- Enumerate the comorbidities associated with over weight and obesity (DM, obstructive sleep apnoea, metabolic syndrome).
- Discuss the role of diet and exercise in weight loss (non surgical/medical management of obesity, low calorie diet, reduction in portion size, changes in frequency of eating, changing

macronutrient composition).

BI-9 Extracellular Matrix

BI 9.1 List the functions and components of Extracellular matrix.

- Define and enlist all the components of Extracellular matrix (ECM).
- Draw a neatly labelled diagram showing all the components of ECM.
- State and explain five biochemical functions of ECM.
- Describe the structure & explain 4 biochemical functions of ECM like collagen, elastin, glycoproteins & Lens proteins.
- Draw and explain the structure of proteoglycans.
- Explain 5 biochemical functions of proteoglycans with examples.
- Explain the biochemical role of fibrillin, fibrin and laminectin.

BI 9.2 Discuss the involvement of ECM components in health &disease

- Enumerate 4 disorders associated with collagen and elastin synthesis.
- Explain the biochemical defect in osteogenesis imperfecta, Ehler Danlos syndrome, Marfan's syndrome, Scurvy, Menke's disease.
- Discuss the biochemical basis of mucopolysaccharidoses.
- Discuss the laboratory diagnosis of Mucopolysaccharidoses.
- Discuss in brief the disorders associated with Glycoproteins.

BI 9.3 Describe protein targeting & sorting along with its associated disorders.

- Explain the mechanism of protein targeting by signal sequence with the emphasis on Golgi Apparatus and Rough Endoplasmic Reticulum.
- Explain the role of Golgi apparatus in proteins sorting.
- Describe the role of signal peptide and other special signals in protein targeting.
- Explain the role of ubiquitin in protein degradation.
- Enlist disorders associated with protein sorting & targeting .

BI-10 Oncogenesis and immunity

BI10.1: Describe the cancer initiation, promotion, oncogenes and oncogene activation. Also focus on p53 and apoptosis

BI10.2: Describe various biochemical tumor markers and the biochemical basis for cancer therapy

- Explain different phases of cell cycle and its regulation
- Describe the role of tumor suppressor genes and p53 in cell cycle regulation
- Define cancer, promotion, proto oncogenes, oncogenes and tumor suppressor genes
- Differentiate between the features of normal and cancerous cell
- Describe the process of cancer initiation and promotion
- Enlist different proto oncogenes or oncogenes with associated cancers
- Explain the mechanisms of activation of protooncogenes to oncogenes with suitable examples
- Describe the role of tumor suppressor genes in carcinogenesis
- Define apoptosis and enlist the apoptosis mediating genes (p53) and its role in apoptosis.
- Define tumor marker and enlist various tumor markers with its clinical importance

- Enlist any four anti cancer drugs and discuss the biochemical basis of cancer therapy.
- Explain the rationale behind the use of anticancer drugs
- Describe the role of monoclonal antibody in cancer treatment

BI10.3: Describe the cellular and humoral components of the immune system and describe the types and structure of antibodies

- Name the primary and secondary lymphoid organs
- Enumerate the types of Immunoglobins
- Illustrate the structure and functions of various types of immunoglobins
- Discuss the functions of various structural elements in the immunoglobin
- Describe the components of cellular and humoral immunity with its mechanism
- Discuss about antibody class switching in immune response
- Describe the role of Antibody diversity in immune system
- Define the principle of hybridoma cell formation
- Enumerate the uses of monoclonal antibodies
- Distinguish between primary and secondary immune responses
- Enumerate the causes for hyper & hypogammaglobulinemia

BI10.4: Describe and discuss innate and adaptive immune responses, self/ nonself recognition and the central role of T-helper cells in immune responses

- Classify immune responses and give examples for each type
- Discuss the mechanism of innate immunity
- Discuss the mechanism of adaptive immunity
- Describe the central role of T-helper cells in immune responses
- Describe the mechanisms of self and non-self recognition
- State the immunological basis of graft versus host rejection
- Elucidate the role of major histocompatibility antigens in self-recognition and graft versus host rejection
- Describe the concepts of immune tolerance and autoimmunity
- Discuss the basis of immunotherapy
- Distinguish between types of hypersensitivity reactions
- List the cytokines with their source, target and functions which control immune responses

- Describe the biochemical basis of immunodeficiency states like Severe combined immunodeficiency syndrome (SCID) and HIV – Acquired immunodeficiency syndrome.

BI10.5: Describe antigens and concepts involved in vaccine development

- Define antigens with types of antigens on the basis of immune response (complete antigen, hapten and determinants of antigenicity)
- Describe the types of antigens based on their origin (exogenous, endogenous and autoantigens)
- Differentiate between immunogenicity and antigenicity
- Explain the mechanism of immunity through vaccination
- Discuss briefly the steps of vaccine development
- Enumerate common vaccines under National Immunisation program
- Discuss the future prospective of COVID vaccine under trial.

BI-11 Biochemical Laboratory Tests

BI 11.1 Describe commonly used laboratory apparatus and equipments, good safe laboratory practice and waste disposal

- Identify along with their uses of the following lab apparatus: test tube and centrifuge tube, measuring cylinder, flask (round bottom, conical/ Erelnmeyer, volumetric), pipette (glass-transfer, graduated, Pasteur & micropipette), burette, beaker, funnel, petri dish, cuvettes, test tube holder, test tube rack, spatula, Bunsen burner, tripod stand with wire mesh, glass rod stirrer, wash bottle, dispenser, Folin Wu tube and vortex mixer.
- Handle with care and maintenance of glassware & plastic ware like cleaning/rinsing and identify inadequate rinsing.
- Identify along with their uses of the following lab equipment:
- Ion selective electrode, pH meter, water bath, colorimeter, spectrophotometer, Esbach's albuminometer, electrophoresis chamber, chromatography chamber
- Handle carefully the concentrated acids/alkalis, boiling liquids, chemicals, Bunsen burner and pipette/ dispense various solutions including acids and alkalis.
- Identify infectious from non-infectious waste and discard accordingly in appropriate color-coded bins/ bins with colored liners.

BI 11.2 Describe the preparation of buffers and estimation of pH.

- Plan the preparation of buffers that are commonly used in lab like phosphate buffer, barbitone buffer, tris-buffer and citrate buffer.
- Explain the applications of the most commonly used buffers
- Determine the pH of the buffer by indicators, pH paper and pH meter.
- Understand and operate the pH meter along with use of standard pH solutions for calibration
- Understand the handling and maintenance of pH meter.

BI-11.3 Describe the chemical components of normal urine

BI-11.4 Perform urine analysis to estimate and determine normal and abnormal constituents

BI-11.5 Describe screening of urine for inborn errors & describe the use of paper chromatography

BI-11.6 Describe the principles of colorimetry

BI-11.7 Demonstrate the estimation of serum creatinine and creatinine clearance

BI-11.8 Demonstrate estimation of serum proteins, albumin and A:G ratio

BI-11.9 Demonstrate the estimation of serum total cholesterol and HDL cholesterol

BI-11.10 Demonstrate the estimation of triglycerides

BI-11.11 Demonstrate estimation of calcium and phosphorous

BI-11.12 Demonstrate the estimation of serum bilirubin

BI-11.13 Demonstrate the estimation of SGOT/ SGPT

- Explain the enzymatic reaction and its clinical significance.
- Describe kinetic method, use of spectrophotometric technique and noan-colour development in the estimation.
- Differentiate end-point method and kinetic method.
- Introduce the instrument used – Semi auto analyser/Auto analyser/ Name of the machine
- Method used.
- Principle
- Reagents provided and preparation of working reagent
- Sample (Implication of hemolysed/icteric/lipemic samples and proper centrifugation of blood).
- Procedure
- Calculation of enzyme activity and factor used/ Unit of enzyme activity..
- Linearity
- Reference range
- System parameters.
- Describe the diagnostic importance of the enzyme/ Isoenzymes

BI-11.14 Demonstrate the estimation of alkaline phosphatase

- Explain the enzymatic reaction and its clinical significance.
- Method used.
- Principle
- Reagents provided and preparation of working reagent
- Sample (Implication of hemolysed/icteric/lipemic samples and proper centrifugation of blood).
- Procedure
- Calculation of enzyme activity and factor used/ Unit of enzyme activity..
- Linearity

- Reference range
- System parameters.
- Describe the diagnostic importance of the enzyme/ Isoenzymes

BI-11.15 Describe & discuss the composition of CSF

- Define Cerebrospinal fluid.
- Describe the formation and circulation of CSF briefly.
- Mention the the sample collection of CSF.
- mention the transportation of CSF sample.
- Describe the physical characteristics and chemical composition of CSF in health and disease.
- List out the analytes routinely estimated in CSF, in lab, and their normal values.
- Mention the changes in cellular components of CSF in cancer.
- Tabulate the various physical and chemical changes in CSF in various disorders.

BI 11.16 Observe use of commonly used equipments / techniques in biochemistry laboratory including pH meter

- Identify the following lab equipment's: Centrifuge, pH meter, ABG analyser, automated/ integrated analyser, semi-automated analyser like ELISA reader, electrolyte analyser and PCR

BI-11.17 Explain the basis and rationale of biochemical tests done in the following conditions:

- diabetes mellitus,
- dyslipidemia,
- myocardial infarction,
- renal failure, gout,
- proteinuria,
- nephrotic syndrome,
- edema,
- jaundice,
- liver diseases, pancreatitis, disorders of acid- base balance, -
- thyroid disorders

BI-11.18 Discuss the principles of spectrophotometry.

BI 11.19 Outline the basic principles involved in the functioning of instruments commonly used in a biochemistry laboratory and their applications.

- Explain the principle and applications of photometry, potentiometry, electrophoresis, chromatography, PCR, centrifugation, ELISA and chemilumniscence.

BI-11.20 Identify abnormal constituents in urine, interpret the findings and correlate these with pathological states.

BI-11.21 Demonstrate estimation of glucose, creatinine, urea and total protein in serum

BI-11.22 Calculate albumin: globulin (AG) ratio and creatinine clearance

BI-11.23 Calculate energy content of different food Items, identify food items with high and low glycemic index and explain the importance of these in the diet.

- Define calorific values of proteins, lipids, carbohydrates.
- Calculate energy content of common food material by using standard charts.
- Define glycemic index .
- Enlist the common food items with their energy content and glycemic index
- Understand importance of glycemic index and calorific value in planning the diet for pregnant women, children and patients with diabetes mellitus, PEM ,Obesity, cardiac disease.
- Communicate the importance of these nutrients to the above patients in empathetic manner

BI-11.24 Enumerate advantages and/or disadvantages of use of unsaturated, saturated and trans fats in food.

- Differentiate the common food items as sources of unsaturated saturated and trans fatty acids.
- Enlist the advantages and disadvantages of using unsaturated saturated and trans fatty acids in daily diet.
- Communicate the importance of the saturated unsaturated and trans fatty acids in planning the diet for pregnant women , children and patients with diabetes mellitus, PEM ,Obesity, cardiac disease in empathetic manner.

Course outcome

Students who successfully complete Biochemistry are expected to,

CO 1: Understand the molecular and functional organization of cell and its sub cellular components

CO 2: Understand the enzymes, their types, enzyme activity, their diagnostic role and therapeutic uses

CO 3: Compare the biomedical importance of different classes of carbohydrates. Describe the disorders associated with digestion and absorption of carbohydrates and understand the biomedical importance of various pathways of carbohydrate metabolism and its disorders. Discuss and interpret laboratory results of analytes associated with the metabolism of carbohydrates.

CO 4: Differentiate the biomedical importance of main classes of lipids. Describe the disorders associated with digestion and absorption of lipids and understand the biomedical importance of various pathways of lipid metabolism and its disorders. Discuss and interpret laboratory results of analytes associated with the metabolism of lipids.

CO 5: Understand the structural organization of proteins and apply the knowledge in the pathogenesis of disorders associated with hemoglobin. Describe the common disorders associated with digestion &absorption and metabolism of proteins. Discuss and interpret laboratory results of analytes associated with the metabolism of proteins.

CO 6: Describe the role of vitamins in normal physiology. Identify the deficiency and potential toxic effect of vitamins.

CO 7: Illustrate the structure and functions of nucleic acids. Explain the common disorders associated with metabolism of nucleotides Describe the process involved in the central dogma of molecular biology. Describe Cell cycle , gene mutation, and regulation of gene expression . Define the role of xenobiotics in diseases. Understand the diagnostic and therapeutic applications of recombinant DNA technology and PCR.

CO 8: Discuss the metabolic adaptations that occur in the fed and fasting state in the major organs.

CO 9: Understand the process involved in maintenance of normal PH , water & electrolyte balance in the body fluids and derangements associated with these.

CO 10: State the various components of immune system

CO 11: Describe the role and requirement of mineral nutrition.

CO 12: Relate and interpret the various analytes used in the differential diagnosis of disorders of liver, kidney, thyroid and adrenal glands.

CO 13: Discuss the source, calorific value, functional importance of various dietary components and beneficial effects of dietary fibers. Explain the various nutritional disorders, its causes and health risk associated with these Apply the knowledge of nutrients and its calorific value in the prescription of diet in conditions like diabetes mellitus, coronary artery diseases and pregnancy.

CO 14: Enumerate the commonly used equipments & apparatus and mention its uses. Describe the measures taken to ensure good laboratory safety practice and medical waste disposal

CO 15: Outline the biochemical basis of environmental health hazards, biochemical basis of concer and carcinogen.

Syllabus

The syllabus has been drafed as specific learning objective for first MBBS students. Thcvbne students must be able to fulfil the specific learning objective listed under each heading.

CELL AND CELLULAR ORGANELLES: (2HRS)

Basics of structure of a eukaryotic cell.

Overview of cellular organelles and their functions (mitochondria, nucleus, ribosomes, proteasomes, lysosomes, endoplasmic reticulum and golgi apparatus)
Functions of peroxisomes.
Markers of sub- cellular organelles.

ENZYMES: (5 HRS)

Nomenclature and classification:
Systematic and recommended nomenclature.
IUBMB classification of enzymes – main classes of enzymes only (names, definition, general reaction catalysed and one example for each class)

Properties of enzymes
Mechanism of action of an enzyme with regard to its effect on activation energy of a reaction.

Concept of active site in enzymes.

Specificity of enzymes: reaction and substrate specificity, with an example for each.

Cofactors - metals and coenzymes (definition, examples of coenzymes) and examples of enzymes that require them.

Lock and key and induced fit models of enzyme-substrate binding.

Factors that influence enzyme activity:
Effect of pH (concept of optimal pH with examples).
Effect of temperature (concept of optimal temperature).
Effect of substrate concentration (Michaelis Menten equation [no derivation of equation required], concept of K_m and V_{max}).
Effects of enzyme and product concentration.

Inhibition of enzymes:
Types of enzyme inhibition - competitive, non competitive, suicide inhibition.
Effects of competitive and non-competitive inhibition on Km and Vmax of the enzyme.
Examples of commonly used drugs that act by competitive inhibition of enzymes.
Examples of non competitive enzyme inhibition – organophosphorus/cyanide poisoning

Isoenzymes:
Definition and examples
Clinical significance of elevated plasma levels of isoenzymes of creatine kinase (CK)

Diagnostic and therapeutic enzymes (clinically useful enzymes):
Aspartate aminotransferase (AST), alanine aminotransferase (ALT), alkaline phosphatase (ALP), lactate dehydrogenase (LDH), creatine kinase (CK) and amylase as markers of various disease conditions.
Plasma markers of myocardial infarction and liver damage.
Examples of enzymes used in treatment and indications for their use.

Clinical utility of 5- nucleotidase and gamma-glutamyl transferase

Regulation of enzyme activity:
Overview of mechanisms involved in regulating the activity of enzymes: allosteric activation and inhibition, covalent modifications (phosphorylation and dephosphorylation), induction and repression; concept of feedback inhibition.
Process of regulation of glycogen metabolism may be used as an example to explain the mechanisms of enzyme regulation, as listed above.

CHEMISTRY AND METABOLISM OF CARBOHYDRATES (15 HRS)

Chemistry of carbohydrates:
Overview of classification of carbohydrates, with physiologically important examples and functions of each of these.
Benedict's test for reducing sugars.
Components of physiologically important disaccharides and polysaccharides.
Homopolysaccharides – starch, glycogen and cellulose
Concept of deoxy and amino sugars and their functions.
Heteropolysaccharides (heparin, hyaluronic acid, chondrointinsulphate, heparansulphate, dermatan sulphate) and their importance in the body.

Digestion of carbohydrates:
Examples of common dietary carbohydrates and the foods that they are present in.
Enzymes involved in digestion of carbohydrates. Sources, sites and actions of the enzymes that digest carbohydrates. End products of digestion and their absorption.
Rationale for the composition and use of oral rehydration solution (ORS) in the treatment of dehydration.
Lactose intolerance.
Importance of dietary fibre.

Glucose transporters:
Types, functions, tissue specificity and physiological relevance.

Glycolysis:
Definition, importance, cellular site and pathway involved (with emphasis on the importance of the pathway, sites of utilization and generation of energy and irreversible reactions involved).
Importance of aerobic and anaerobic forms of glycolysis.
Energetics.
Concept of substrate level phosphorylation.
Overview of regulation of glycolysis. Rapaport- Leubering shunt and its physiological importance.
Concept of lactic acidosis and common causes and conditions in which it occurs.
Importance of inhibition of enolase by fluoride in blood samples collected for glucose estimation.

Citric acid cycle/ Krebs' cycle / tricarboxylic acid (TCA) cycle:
Pyruvate dehydrogenase as a link between glycolysis and Krebs' cycle (no details of reaction mechanism required).
Definition, importance, cellular site, pathway (including intermediates and enzymes involved, but excluding details of reactions involved).
Concept of anaplerosis, amphibolic nature of Krebs' cycle.
Energetics.
Overview of regulation of pathway (no details required).

Pentose phosphate pathway (PPP):
Importance of pathway - ribose for nucleic acid synthesis and NADPH for synthesis of various lipids, maintenance of reduced form of iron in haemoglobin, reduced glutathione and its importance in

maintaining red cell membrane integrity.
Clinical relevance of the deficiency of glucose-6- phosphate dehydrogenase (G6PDH).
Definition, cellular site and overview of pathway, showing starting material and products (intermediates not required).

Glycogenesis:

Physiological importance of glycogen in the body (including role of glycogen in the liver and in the muscle).
Overview of pathway of synthesis (starting material, action of glycogen synthase and branching enzyme and the end product).
Glycogen storage disorders.

Glycogenolysis:

Physiological importance of glycogen breakdown in the body.
Overview of pathway of breakdown in the liver and muscle (starting material, action of glycogen phosphorylase and debranching enzyme and products obtained).
Role of insulin and glucagon in reciprocal regulation of glycogenesis and glycogenolysis (details of reactions involved in regulation not required).
Examples of glycogen storage diseases (Von Gierke's disease and McArdle's disease) may be used to illustrate functions of glycogen in the liver and muscle and the reasons for different manifestations of the diseases.

Gluconeogenesis

Definition, substrates used, physiological importance, sites in the body and in cell where the pathway occurs.
Overview of pathway with key intermediates and enzymes.
Importance of Cori's cycle and glucose-alanine cycle.
Concept of reciprocal regulation of glycolysis and gluconeogenesis (no details required).
Role of insulin and glucagon in regulation.

Uronic acid pathway:

Overview of pathway showing starting material (glucose) and product (glucuronic acid).
Importance of glucuronic acid in conjugation of bilirubin and drugs and synthesis of heteropolysaccharides.
Essential pentosuria.

Metabolism of galactose:

Dietary sources of galactose.
Overview of pathway by which galactose is metabolized (showing the sites of 3 main enzymes involved).
Eventual fate of galactose in the body.
Galactosemia (definition, causes, biochemical basis of clinical manifestations and rationale of treatment).

Metabolism of fructose:

Dietary sources of fructose.
Overview of pathway by which fructose is metabolized (showing entry into glycolysis and formation of triacylglycerol).
Importance of fructose in seminal fluid.
Disorders of fructose metabolism.

Minor pathways of carbohydrate metabolism

Polyol pathway and its importance in pathogenesis of complications of diabetes mellitus.

Regulation of blood glucose levels

Factors maintaining blood glucose levels – role of dietary carbohydrates, role of hormones (insulin, glucagon, glucocorticoids and catecholamines) and roles of liver and kidney.

Diabetes mellitus

Types and pathogenesis of diabetes mellitus.
Concept of insulin resistance.
Metabolic derangements and clinical features.
Diagnostic criteria (ADA criteria).
Concept of impaired fasting glucose and impaired glucose tolerance.
Gestational diabetes – definition and diagnosis
Acute and chronic complications of diabetes mellitus.
Pathogenesis of diabetic ketoacidosis.
Pathogenesis of chronic complications of diabetes mellitus.

Laboratory investigations in diabetes mellitus

Blood glucose estimations (fasting and post prandial).
Glycated haemoglobin (HbA1c).
Urinalysis for detection of glucose, ketone bodies and proteins in urine.
Detection and importance of microalbuminuria.
Role of glucose tolerance test in diagnosis of diabetes mellitus.
Indications for and interpretation of results of glucose tolerance test (OGTT), including use in gestational diabetes mellitus (GDM).
Serum lipid profile in diabetics.

Hypoglycemia

Definition, importance, causes, clinical manifestations.

CHEMISTRY AND METABOLISM OF LIPIDS (15 hrs)

General features of lipids

Definition of a lipid.
Properties with regard to solubility and hydrophobicity.
Important functions of lipids in the human body.
Concept of importance of lipids in causation of disease (atherosclerosis with subsequent myocardial infarction and stroke; obesity, cholelithiasis, etc).

Classification of lipids

Major types of lipids in the body (classification into simple, complex and precursor or derived lipids).
Relevant examples of each type and the importance of each type in the body

Fatty acids

Concept of system of nomenclature (concept of systematicnames and symbols), with C and n numbering of fatty acids.
Classification system based on chain length, degree of saturation (saturated and mono- and polyunsaturated fatty acids), and nutritional requirement.
Concept of saturated fatty acids in animal fat and unsaturated fatty acids in plant fats.
Names of essential fatty acids and their functions.
Importance of ω3 and ω6 fatty acids (dietary sources and their health benefits).

Simple lipids (fats)

Concept of importance of saturated and unsaturated fats in one's diet (including hydrogenation of oils).
Basic concept of cis and trans forms of fatty acids and the health hazards of trans fats.
Basic concept of mono, di- and triacylglycerols and where they are found in the body.

Derived lipids – steroids

Functions of cholesterol
Health hazards associated with high blood levels of cholesterol.

Complex lipids

Lipoproteins - definition, general structure, types, components of each type, function of each type, role of apoproteins, importance in health and disease.

Phospholipids (definition, types, components, amphipathic nature, functions, clinically relevant examples)
Importance of each type of phospholipid: phosphatidylcholine (including importance of surfactant in health and disease, concept of lecithin/sphingomyelin [L/S] ratio), phosphatidylinositol and sphingomyelin
Liposomes (definition, structure and importance)
Glycolipids - definition, types, components, functions, examples.
Basic concepts of cerebrosides and gangliosides and importance of each type in the body.
Basic concept of abnormalities in lipids in demyelinating diseases and sphingolipidosis

Miscellaneous:

Micelles (definition, structure and importance).
Biological membranes (structure and importance).
Basic concepts of transport mechanisms across membranes

Metabolism of lipids

Digestion of lipids

Names of main lipids present in the diet.
Enzymes responsible for digestion of lipids and their sources and sites of action.
Role of bile in lipid digestion and absorption.
End-products of lipid digestion.
Process of absorption of lipids.
Steatorrhoea.
Salient features of formation, metabolism and physiological importance of chylomicrons.

Fate of fatty acids

Fatty acid oxidation

Importance of oxidation of fatty acids in the body.
Types of oxidation of fatty acids.
Beta-oxidation of even chain fatty acids (site, activation of a fatty acid, the role of carnitine, steps involved and energetics of the process)
End-products of beta- oxidation of odd chain fatty acids.
Alpha oxidation of fatty acids.
Conditions where fatty acid oxidation is impaired.

Biosynthesis of fatty acids (lipogenesis)

Conditions under which it occurs and sites involved.
Starting material and end products of fatty acid synthesis.
Source of acetyl CoA.
Regulatory role of acetyl CoA carboxylase.
Overall reaction catalyzed by fatty acid synthase (individual enzymes and reactions not required).
Importance of NADPH in the pathway and its sources.
Role of the nutritional state and insulin as factors that regulate synthesis of fatty acids

Metabolism in the adipose tissue

Metabolism in the adipose tissue with regard to lipogenesis and lipolysis (conditions where it occurs, and products obtained) and its regulation by hormones, including enzymes involved

Metabolism of ketone bodies

Names of the ketone bodies and their importance.
Pathway of ketogenesis and utilization of ketone bodies and sites where these occur.
Factors that favour ketone body formation.
Causes and clinical importance of ketoacidosis

Metabolism of cholesterol

Functions of cholesterol.
Sources of cholesterol in the body (dietary and endogenous).

Importance of HMG CoA reductase in the regulation of biosynthesis of cholesterol.
Importance of maintaining normal cholesterol levels in blood and ways to reduce blood cholesterol levels (including mechanism of action of statins and other lipid lowering agents).
Bile acids (names, source and functions).
Enterohepatic circulation of bile acids.
Cellular site of biosynthesis of cholesterol.
Basic overview of biosynthesis of cholesterol (showing starting material, HMG CoA [HMG CoA synthase], mevalonate [action of HMG CoA reductase] and formation of cholesterol, without showing any other intermediates).
Overview of synthesis (including regulatory enzyme)
Role of lipids in formation of gall stones.

Metabolism of lipoproteins

Association of high levels of LDL with atherosclerosis.
Anti-atherogenic effect of HDL
Brief overview of metabolism of VLDL, LDL and HDL (including reference values).
Lipoprotein (a)
Dyslipidemias – causes (with emphasis on secondary causes of dyslipidemia and familial hypercholesterolemia) and consequences.
Risk factors for atherosclerosis and coronary artery disease; prevention of coronary artery disease.
Overview of metabolic syndrome

Eicosanoids

Names and functions of various eicosanoids. Role of aspirin as an anti-platelet agent.
Mechanism of action of NSAIDs and their effect as anti-inflammatory agents
Therapeutic uses of prostaglandins.

Phospholipids

Clinical relevance of lecithin-sphingomyelin (L/S) ratio in amniotic fluid
Biochemical defect and clinical features of Niemann-Pick's, Tay- Sach's and Gaucher's disease.
Sites of action of various phospholipases .
Sphingolipidosis other than the examples specified.

Miscellaneous

Role of liver in lipid metabolism.
Fatty liver (causes, including role of lipotropic factors, and consequences).

CHEMISTRY AND METABOLISM OF PROTEINS (15 hrs)

Amino acids

Classification based on nutritional requirement and metabolic fates.
Peptide bond formation by amino acids.
Reaction with ninhydrin as a general reaction for all amino acids (details of reaction not required).
Classification of amino acids based on side chain

Peptides and proteins

Structural organization of proteins - primary, secondary, tertiary and quaternary structures.
Denaturation of proteins – definition, agents causing denaturation and consequences (loss of biological activity of protein).
Overview of structure function relationship of haemoglobin, myoglobin and collagen.
Hemoglobinopathies: sickle cell anaemia and thalassemia
Oxygen dissociation curve of haemoglobin; Bohr effect.

Digestion and absorption

Mechanism of activation of enzymes involved in the digestion of proteins in the stomach and small intestine (conversion of zymogens to active proteases) – proteolytic enzymes of the gastric and pancreatic secretions.

Role of gastric acid in protein digestion.
Overview of amino acid absorption.
Disorders associated with amino acid absorption (cystinuria/Hartnup's disease).

General pathways of amino acid catabolism

Overview and biochemical importance of the processes of transamination and oxidative deamination.
Enzymes and coenzymes involved in the above processes.

Ammonia metabolism

Sources of ammonia in the body.
Urea cycle - overview of reactions involved, including regulatory enzyme.
Role of glutamine in detoxification of ammonia in the brain.
Hepatic coma (hepatic encephalopathy);biochemical basis of clinical features
Reference range for blood urea and blood urea nitrogen (BUN).
Overview of disorders of the urea cycle

Metabolism of individual amino acids

Functions of individual amino acids.
Important specialized products from tyrosine – melanin, catecholamines, thyroid hormones.
Formation of tyrosine from phenylalanine.
Pathogenesis, clinical features, diagnosis and treatment of phenylketonuria.
Metabolism of methionine and homocysteine
Roles of folic acid, vitamin B_{12} and pyridoxine in their metabolism.
Role of homocysteine as a risk factor for cardiovascular diseases.
Important specialized products from glycine (glutathione, creatine, creatinine, haem and purines) and tryptophan (serotonin, melatonin and niacin).
Neurotransmitters derived from amino acids (glutamate –gamma-amino butyric acid [GABA], histidine [histamine], arginine [nitric oxide]).
Uncommon disorders of amino acid metabolism: maple syrup urine disease (MSUD), alkaptonuria, tyrosinemias, methymalonyl aciduria, disorders of glycine metabolism, etc.
Importance of neonatal screening for inborn errors of amino acid metabolism.
Principle of the technique of chromatography.

Plasma proteins

Functions of albumin.
Examples of specialized
transport proteins present in plasma.

Reference values of total proteins and albumin.
Common clinical conditions in which plasma protein levels are abnormal and the reasons why these changes occur (malnutrition, cirrhosis of the liver, nephrotic syndrome, chronic renal failure, multiple myeloma).
Importance of the albumin: globulin ratio (A: G ratio). '
Normal value for the A:G ratio and common clinical conditions in which the ratio is abnormal.

Classification of plasma proteins, based on electrophoretic mobility.
Principle of the technique of electrophoresis.

VITAMINS: (10 hrs)

General properties of vitamins

Definition, classification, comparison of clinically relevant features of fat- and water soluble vitamins.
Concepts of hypo- and hypervitaminosis and recommended dietary allowances (RDA).

Fat-soluble vitamins

Vitamin A

Dietary sources.
Various forms of vitamin A and their functions
Precursor form.
Biochemical functions.
Role in Wald's visual cycle.
RDA
Deficiency – causes, manifestations and treatment.
Hypervitaminosis A

Vitamin D

Dietary sources of vitamin D.
Synthesis in the body and conversion to calcitriol.
Biochemical functions.
Role in calcium absorption in small intestine, calcium homeostasis and bone mineralization.
RDA
Deficiency (rickets and osteomalacia) – causes, manifestations, biochemical findings in blood

Vitamin E

Dietary sources
Role as an antioxidant.
Relationship to action of glutathione peroxidase.
RDA
Deficiency leading to fragility of RBCs.

Vitamin K

Sources.
RDA.
Deficiency – causes, manifestations (including hemorrhagic disease of the new born).
Biochemical role in gamma carboxylation reactions.
Vitamin K cycle.
Basis of action of warfarin and other dicumarol derivatives.

Water-soluble vitamins

Thiamine

Dietary sources.
Functions (coenzyme form, physiologically important reactions for which it is required).
RDA
Deficiency (beri-beri) – causes and manifestations
Wernicke-Korsakoff syndrome - causes, clinical features

Riboflavin

Dietary sources.
Functions (coenzyme forms, physiologically important reactions for which they are required).
RDA
Deficiency – causes and manifestations.

Niacin

Sources (including from tryptophan).
Functions (coenzyme forms, examples of physiologically important reactions for which they are required).
RDA
Deficiency – causes and manifestations of pellagra.

Pyridoxine

Dietary sources.
Functions (coenzyme form, physiologically important reactions for which they are required, including transamination and decarboxylation of amino acids).

RDA.
Deficiency – causes and manifestations.
Rationale for supplementation in treatment of tuberculosis.

Pantothenic acid

Sources, functions and RDA

Biotin

Sources.
Role in carboxylation reactions.
Examples of important enzymes that require biotin.

Folic acid

Dietary sources.
Functions (coenzyme forms, physiologically important reactions for which they are required).
RDA
Relationship with vitamin B_{12} and concept of "folate trap".
Deficiency – causes andmanifestations (megaloblastic anemia).
Importance of supplementation in peri-conceptual period.
Folate antagonists (action of methotrexate, aminopterin and sulphonamides).
Role of folic acid in one-carbon metabolism (one carbon donor reactions (e.g., serine Hydroxymethyl transferase), one carbon acceptor reactions (methionine synthase, thymidylate synthase and de novo purine synthetic pathway).

Vitamin B_{12}

Dietary sources.
Absorption and role of intrinsic factor of Castle.
Functions (coenzyme forms, reactions for which they are required).
Role in folic acid metabolism (concept of "folate trap" in B_{12} deficiency)
RDA
Deficiency – causes and manifestations (megaloblastic and pernicious anemia).
Importance of combined B_{12} and folic acid administration in treatment of megaloblastic anemia.

Vitamin C

Dietary sources.
Functions (in collagen synthesis, iron absorption and as an anti-oxidant).
RDA.
Deficiency – causes and manifestations of scurvy
Role of vitamin C in the conversion of tyrosine to catecholamines, cholesterol to bile acids and in catabolism of tyrosine.

Vitamin-like substances Lipoic acid

Role in reactions involving pyruvate dehydrogenase and alpha ketoglutarate dehydrogenase.

NUCLEOTIDE CHEMISTRY AND METABOLISM (6 hrs)

Nucleotide chemistry

Purine and pyrimidine bases found in DNA and RNA.
Definition and types of nucleosides and nucleotides.
Functions of physiologically important nucleotides.
Examples of synthetic analogues of purine and pyrimidine bases and nucleosides used as therapeutic agents (anti-cancer drugs, anti-viral drugs and allopurinol).

Nucleotide metabolism

Role of folic acid in purine synthesis.
Overview of the pathway of degradation of purines to form uric acid, including role of xanthine oxidase.
Hyperuricemia and gout (causes, clinical features, principles of treatment, including mechanism of action of allopurinol and probenecid)

Role of folic acid in purine synthesis.
Names of compounds required for purine and pyrimidine synthesis.
Salvage pathway for purine bases and nucleosides. Lesch- Nyhan syndrome (cause and biochemical basis of clinical features).
Mechanism of action of methotrexate and 5-flurouracil, as examples of drugs used in cancer chemotherapy.

Overview of the pathway of de novo synthesis of purine nucleotides (names of only starting material and end products – AMP and GMP - required).
Overview of pathway of de novo synthesis of pyrimidine nucleotides, showing only starting material, rate limiting enzyme and end products.
Disorders of pyrimidine metabolism: orotic aciduria

INTEGRATED METABOLISM (3 hrs)

Overview of metabolism in the fed and fasting states
Overview of metabolism in liver, brain and adipose tissue

BIOENERGETICS (3 hrs)

Role of ATP

Role of ATP as the "energy currency" of the cell.
Role of high energy phosphates in energy capture and transfer e.g., role of creatine phosphate in muscle

The respiratory chain and oxidative phosphorylation

Sources of reducing equivalents in the cell (NADH and $FADH_2$).
Role of mitochondria as the "power house" of the cell. Substrate level and oxidative phosphorylation.
Schematic representation of the electron transport chain.
Role of the respiratory chain as an electron transporter and a proton pump.
Chemiosmotic theory of oxidative phosphorylation.
Amount of ATP synthesized when NAD and FAD act as hydrogen acceptors
Transport of cytosolic NADH into the mitochondria (mitochondrial shuttle systems).
Examples of inhibitors of electron transport chain (carbon monoxide, cyanide) and uncouplers of oxidative phosphorylation n (free fatty acids, thyroxine, thermogenin).
Role of brown fat (non shivering thermogenesis and role of uncoupling protein/ thermogenin).
Overview of complex V (ATP synthase).

HOMEOSTATIC MECHANISMS IN THE BODY (4hrs)

Acid base balance
Definitions of acid, base and buffer.
Normal pH of body fluids and importance of maintaining normal pH
Sources of hydrogen ions in the body.
Mechanisms involved in regulation of pH
Buffers of body fluids
Henderson – Hasselbalch equation.
Role of buffers (with emphasis on the bicarbonate buffer system)
Role of the lungs and kidneys in maintaining acid- base balance.
Simple acid-base disorders:
Major causes and clinical features of:
• Metabolic acidosis (including importance of anion gap) and alkalosis
• Respiratory acidosis and alkalosis.
Arterial blood gases (ABG) analysis and interpretation of results.
Compensatory mechanisms in metabolic/respiratory acidosis/alkalosis.

Fluid and electrolyte balance

Distribution of water in various body compartments.

Intra- and extracellular fluid composition (sodium and potassium)
Blood volume and osmolality.
Major causes and clinical features of dehydration.

Sodium:

Normal levels in the blood.
Physiological functions.
Regulation of sodium homeostasis (including the role of renin-angiotensin-aldosterone system).
Major causes, clinical features of hyponatremia and hypernatremia

Potassium:

Normal levels in the blood.
Physiological functions. Regulation of potassium homeostasis.
Major causes and clinical features of hypokalemiaandhyperkalemia.
Regulation of osmolality– role of anti-diuretic hormone (ADH).

IMMUNOLOGY (2 hrs)

Introduction to immunoglobulins
Types, properties and functions of different classes of immunoglobulins.
Multiple myeloma – biochemical abnormalities and laboratory diagnosis.

MINERALS (5 hrs)

Concept of macro and micro minerals and examples.
Sources and daily requirement.

CALCIUM

Normal blood levels.
Functions of calcium.
Role of vitamin D in absorption of calcium.
Regulation - role of parathyroid hormone (PTH), calcitonin and vitamin D in calcium homeostasis.
Important causes, clinical features, laboratory diagnosis of hypocalcemia and hypercalcemia
Osteoporosis and osteomalacia - major causes, clinical features.

Iron

Sources and daily requirement.
Distribution of iron in the body.
Functions of iron.
Absorption of dietary iron in the duodenum - overview of role of divalent metal transporter-1 (DMT-1), duodenal cytochrome b (dcytb), hephaestin, ferroportin.
Storage and transport (role of ferritin and transferrin).
Causes, clinical features of iron deficiency anemia.
Iron overload conditions, e.g., hereditary haemochromatosis.

Copper

Biochemical functions of copper.
Role of ceruloplasmin.
Genetic basis, clinical features of Wilson's disease.
Biochemical basis of Menke's disease.

Zinc

Functions of zinc.
Causes and clinical features of zinc deficiency.

Magnesium and manganese:

Functions of magnesium and manganese.

Iodine:

Sources and daily requirement of iodine.
Functions of iodine.
Causes and clinical features of iodine deficiency.

Flouride:
Sources and daily requirement of fluoride.
Functions of fluoride.
Causes and clinical features of fluorosis.
Selenium:
Functions of selenium
Functions of magnesium and manganese
HAEM METABOLISM (6 hrs)
Heme synthesis
Importance of haem (heme containing proteins – hemoglobin, myoglobin, cytochromes).
Porphyrias: Definition, biochemical basis of clinical features of porphyrias (neurological features and photosensitivity).
Acquired porphyria: lead poisoning.
Heme synthesis and its regulation in the liver and bone marrow.
Heme degradation
Degradation of haem and fate of bilirubin.
Hyperbilirubinemia – causes and role of laboratory investigations in the differential diagnosis of jaundice.
Jaundice in the newborn.
Congenital disorders of conjugation and excretion of bilirubin – Crigler-Najjar syndrome, Dubin Johnson syndrome, Gilbert's syndrome and Rotor's syndrome
FUNCTION TESTS: (4hrs)
Renal function test:
Functions of the kidney
Clinical importance of blood urea and serum creatinine levels in renal disease.
Estimation of GFR: Creatinine clearance and its importance.
Nephrotic syndrome – majorclinical features and laboratory diagnosis.
Proteinuria – types (glomerular, tubular and overflow proteinuria) and characteristic proteins present in urine in each type.
Microalbuminuria and its importance.
Concepts of tests to assess tubular function – measurement of plasma and urine osmolality

Renal tubular acidosis.
Lab investigations in acute kidney injury and chronic kidney disease
Laboratory tests to diagnose pre renal, renal and post- renal causes of acute renal failure
Liver function tests
Functions of the liver.
Major causes of liver dysfunction.
Tests done to assess liver function in clinical practice:
1. Tests to assess ability to detoxify and excrete substances: conjugated and unconjugated bilirubin (van den Bergh's test), blood ammonia levels.
2. Tests to assess biosynthetic functions: total protein and serum albumin levels, prothrombin time
3. Markers of liver injury: alanine transaminase (ALT) and aspartate transaminase (AST)
4. Marker of cholestasis: alkaline phosphatase (ALP).
Differential diagnosis of jaundice, based on liver function tests.

Thyroid function test:
Regulation of secretion of thyroid hormones.

Importance of estimation of TSH in assessment of thyroid function.

Measurement of total and free thyroxine levels.
Role of TSH and free thyroxine in laboratory diagnosis of hypothyroidism and hyperthyroidism

Adrenal function tests

Hormones produced by the adrenal cortex and medulla.
Regulation of secretion of adrenocortical hormones.

Basic tests done for the laboratory diagnosis of adrenal hypofunction and hyperfunction (serum and urine cortisol).

MOLECULAR BIOLOGY (12 hrs)

The cell cycle, DNA and RNA structure

Watson and Crick model of DNA structure (including simple diagrammatic representation of the salient features of DNA structure).
Types and functions of different types of RNA.
Overview of organization of DNA in a chromosome. Overview of the cell cycle
Overview of the cell cycle
Differences between nuclear and mitochondrial DNA

DNA replication and repair

Overview of the process of DNA replication in eukaryotes
Roles of DNA polymerase, helicase, primase, topoisomerase and DNA ligase
Diagrammatic representation of the events at the replication fork Okazaki fragments and its importance in replication.
Inhibitors of DNA replication as anti cancer drugs.
Overview of role of major DNA repair mechanisms – mismatch repair, base excision repair, nucleotide excision repair and double strand break repair.
Diseases associated with abnormalities of DNA repair systems – xeroderma
Pigmentosa and hereditary non polyposis colon cancer (HNPCC)

Importance of telomeres and telomerase

Transcription

Structure of a gene - concepts of exons and introns, promoter, enhancers/repressors and response elements.
Overview of the process of transcription in eukaryotes – initiation, elongation and termination.
Post-transcriptional processing – capping, tailing and splicing.

Translation and genetic code

Genetic code - definition.
Characteristics of the genetic code – universal, unambiguous, degenerate, without punctuation.
Basis of degeneracy of the genetic code (wobble hypothesis).
Components of eukaryotic ribosomes.
Structure of tRNA (diagram of clover leaf model of tRNA structure) and its function in protein synthesis.
Function of aminoacyl tRNA synthase.
Overview of the process of translation – initiation, elongation and termination
Inhibition of prokaryotic translation by antibiotics.
Post-translational modifications – examples.

Mutations and regulation of gene expression

Mutations:

Definition.
Mutagens- examples of physical, chemical and biological mutagens.
Types of mutations.

- point mutation (deletion, insertion, substitution – transition and transversion, frame shift mutation.
- missense mutation, nonsense mutation and silent mutation
- chromosomal mutations (deletion, inversion)

Relationship of mutations with specific diseases – eg, sickle cell anemia and chronic myeloid leukemia.
Prokaryotes:
The operon concept in prokaryotes (using Lac operon as an example).
Eukaryotes:
Overview of regulation of initiation of eukaryotic transcription: role of general and gene specific transcription

Recombinant DNA technology and techniques in molecular biology

Importance and applications of recombinant DNA technology
Importance and applications of Polymerase chain reaction (PCR)
Restriction endonucleases.
Vectors for cloning – plasmids and phages.
Genomic and cDNA libraries.
Principles and applications of techniques in molecular biology: (Southern, northern and western blotting, restriction fragment length polymorphism [RFLP])
Applications of recombinant DNA technology in medicine. General principles of production of therapeutic proteins, e.g., insulin
Gene therapy
Diagnosis of genetic diseases and genetic \ counseling
Forensic investigation.
Human genome project
DNA fingerprinting
DNA sequencing
Microarrays
Fluorescent in situ hybridization (FISH)
DNA vaccines
Transgenic animals

METABOLISM OF XENOBIOTICS (2 hrs)

Xenobiotics- definition and examples
Biochemical importance of the two phases of xenobiotic metabolism
Conjugation reactions:
• Biochemical role of conjugation reactions (with suitable, clinically relevant examples) - glucuronidation, sulfation, conjugation with glutathione, acetylation.

The cytochrome P450 enzyme system
• Functions
• Properties (especially induction by drugs)
Overview of metabolism of alcohol.
Health hazards associated with alcohol consumption.
Metabolic alterations induced by alcohol metabolism

OXIDATIVE STRESS (1 hrs)

Concepts of reactive oxygen species (ROS), free radicals and oxidative stress and antioxidants.
Mechanisms of generation of reactive oxygen species (ROS) in cells.
Role of antioxidants – vitamin E and glutathione.
Role of antioxidant enzymes –glutathione peroxidase, superoxide dismutase

NUTRITION (3 hrs)

Importance of various macro and micro-nutrients in diet.

Components and importance of each type in diet.
Concept of balanced diet and glycemic index of food.
Importance of dietary fibre.
Basal metabolic rate.
Specific dynamic action (thermogenic effect of food) and respiratory quotient
Common sources of saturated, polyunsaturated and monounsaturated fats in diet and their impact on health.
Importance of trans fats.
Concept of limiting amino acids and supplementary action of dietary proteins.
Protein-energy malnutrition (PEM): marasmus and kwashiorkor - causes and main differences.
Obesity (including calculation and interpretation of body mass index [BMI]; health risks associated with obesity)

IMPORTANCE OF LABORATORY MEDICINE ETHICAL ISSUES IN LABORATORY MEDICINE (2 hrs)

The concept that laboratory testing should respect principles of medical ethics (non maleficence, beneficence, patient autonomy, informed consent, respect for patient, etc).
Ensuring quality and integrity of laboratory services, role and responsibilities when participating in clinical research, optimal use of resources, confidentiality of laboratory results, use of results from screening and testing programs, etc.

Class Time table

VELAMMAL MEDICAL COLLEGE HOSPITAL & RESEARCH INSTITUTE, MADURAI - 625009

Time Table FOR 1ST YEAR MBBS (2021-2022 BATCH)
With Effect From 31st March 2022 to 15th May 2022

DAY	8.00 AM - 09.00 AM	09.00 AM - 10.00 AM	10.00 AM - 11.00 AM	11.00 AM - 01.00 PM			01.00 PM - 02.00 PM	2.00 PM - 4.00 PM	04.00 PM to 05.00 PM
MONDAY	Anatomy	**Biochemistry** - Tutorials/ Small Group Teaching/ Integrated learning.		**Physiology** - Tutorials/ Small Group Teaching/ Integrated learning.			LUNCH BREAK	Anatomy Dissection/ Anatomy Tutorials/ Small Group Teaching/ Integrated learning.	Foundation Course
TUESDAY	Biochemistry	Physiology	Anatomy	**Anatomy Practical**	**Physiology Practical**	**Biochemistry Practical**		Anatomy Dissection/ Anatomy Tutorials/ Small Group Teaching/ Integrated learning	
				A- Batch	B- Batch	C- Batch			
WEDNESDAY	Physiology	Anatomy	Biochemistry	B- Batch	C- Batch	A- Batch		Anatomy Dissection/ Anatomy Tutorials/ Small Group Teaching/ Integrated learning	
THURSDAY	Anatomy	Physiology	Physiology	C- Batch	A- Batch	B- Batch		Anatomy Dissection/ Anatomy Tutorials/ Small Group Teaching/ Integrated learning	
FRIDAY	Anatomy	Physiology	Biochemistry	**Physiology** - Tutorials/ Small Group Teaching/ Integrated learning.				Anatomy Dissection/ Anatomy Tutorials/ Small Group Teaching/ Integrated learning	
SATURDAY	**Anatomy** - Tutorials/ Small Group Teaching/ Integrated learning.		**Community Medicine**					**Community Medicine**	

VICE PRINCIPAL

Class Time table

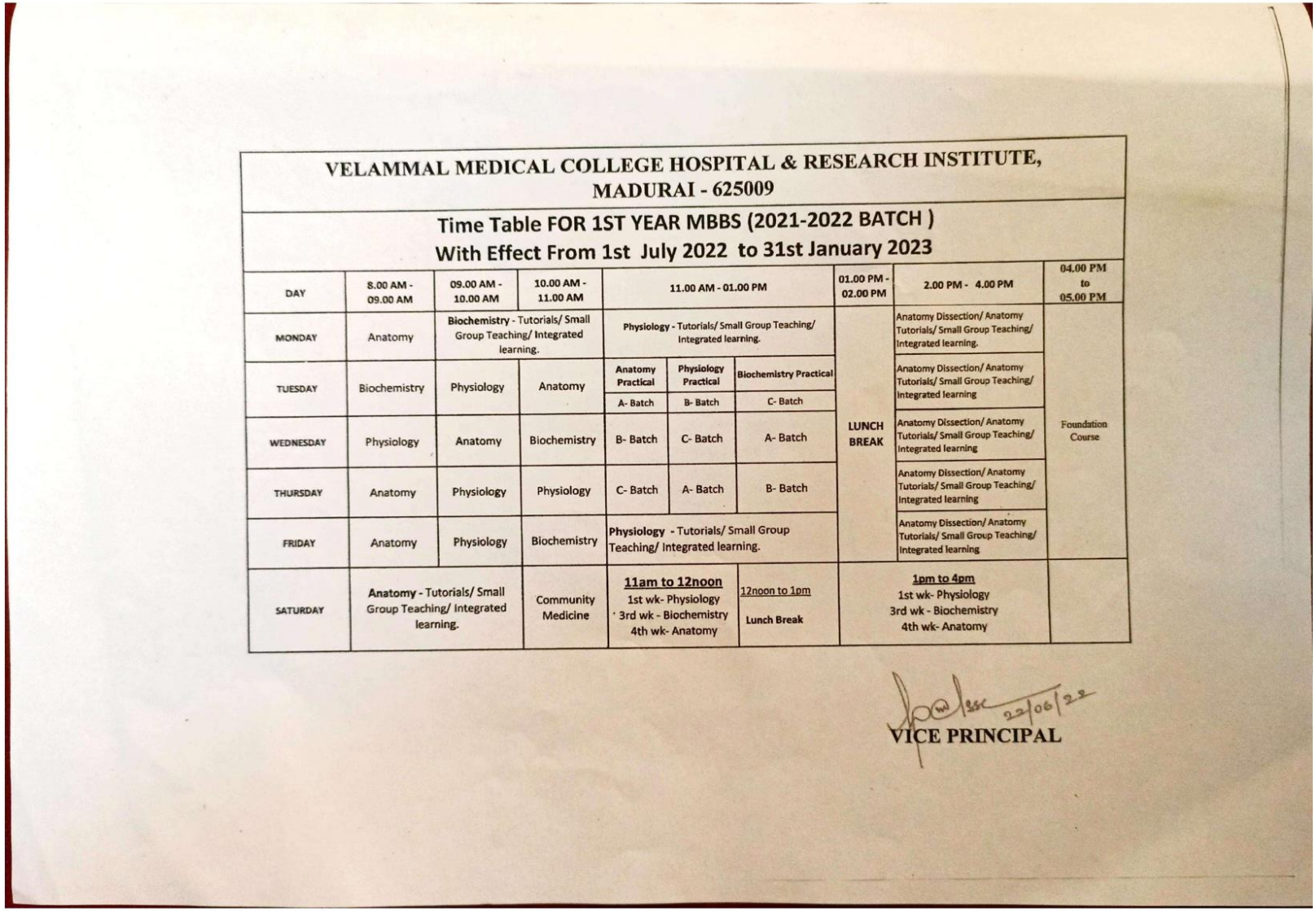
VELAMMAL MEDICAL COLLEGE HOSPITAL & RESEARCH INSTITUTE, MADURAI - 625009

Time Table FOR 1ST YEAR MBBS (2021-2022 BATCH)
With Effect From 16th May 2022 to 31st January 2023

DAY	8.00 AM - 09.00 AM	09.00 AM - 10.00 AM	10.00 AM - 11.00 AM	11.00 AM - 01.00 PM			01.00 PM - 02.00 PM	2.00 PM - 4.00 PM	04.00 PM to 05.00 PM
MONDAY	Anatomy	**Biochemistry** - Tutorials/ Small Group Teaching/ Integrated learning.		**Physiology** - Tutorials/ Small Group Teaching/ Integrated learning.			LUNCH BREAK	Anatomy Dissection/ Anatomy Tutorials/ Small Group Teaching/ Integrated learning.	Foundation Course
TUESDAY	Biochemistry	Physiology	Anatomy	**Anatomy Practical**	**Physiology Practical**	**Biochemistry Practical**		Anatomy Dissection/ Anatomy Tutorials/ Small Group Teaching/ Integrated learning	
				A- Batch	B- Batch	C- Batch			
WEDNESDAY	Physiology	Anatomy	Biochemistry	B- Batch	C- Batch	A- Batch		Anatomy Dissection/ Anatomy Tutorials/ Small Group Teaching/ Integrated learning	
THURSDAY	Anatomy	Physiology	Physiology	C- Batch	A- Batch	B- Batch		Anatomy Dissection/ Anatomy Tutorials/ Small Group Teaching/ Integrated learning	
FRIDAY	Anatomy	Physiology	Biochemistry	**Physiology** - Tutorials/ Small Group Teaching/ Integrated learning.				Anatomy Dissection/ Anatomy Tutorials/ Small Group Teaching/ Integrated learning	
SATURDAY	**Anatomy** - Tutorials/ Small Group Teaching/ Integrated learning.		**10am to 12noon** 1st wk- Physiology 3rd wk - Biochemistry 4th wk- Anatomy	12noon to 1pm **Lunch Break**			**1pm to 4pm** 1st wk- Physiology 3rd wk - Biochemistry 4th wk- Anatomy		———

VICE PRINCIPAL

Class Time table



VELAMMAL MEDICAL COLLEGE HOSPITAL & RESEARCH INSTITUTE, MADURAI - 625009

Time Table FOR 1ST YEAR MBBS (2021-2022 BATCH)
With Effect From 1st July 2022 to 31st January 2023

DAY	8.00 AM - 09.00 AM	09.00 AM - 10.00 AM	10.00 AM - 11.00 AM	11.00 AM - 01.00 PM			01.00 PM - 02.00 PM	2.00 PM - 4.00 PM	04.00 PM to 05.00 PM
MONDAY	Anatomy	**Biochemistry** - Tutorials/ Small Group Teaching/ Integrated learning.		**Physiology** - Tutorials/ Small Group Teaching/ Integrated learning.			LUNCH BREAK	Anatomy Dissection/ Anatomy Tutorials/ Small Group Teaching/ Integrated learning.	Foundation Course
TUESDAY	Biochemistry	Physiology	Anatomy	**Anatomy Practical**	**Physiology Practical**	**Biochemistry Practical**		Anatomy Dissection/ Anatomy Tutorials/ Small Group Teaching/ Integrated learning	
				A- Batch	B- Batch	C- Batch			
WEDNESDAY	Physiology	Anatomy	Biochemistry	B- Batch	C- Batch	A- Batch		Anatomy Dissection/ Anatomy Tutorials/ Small Group Teaching/ Integrated learning	
THURSDAY	Anatomy	Physiology	Physiology	C- Batch	A- Batch	B- Batch		Anatomy Dissection/ Anatomy Tutorials/ Small Group Teaching/ Integrated learning	
FRIDAY	Anatomy	Physiology	Biochemistry	**Physiology** - Tutorials/ Small Group Teaching/ Integrated learning.				Anatomy Dissection/ Anatomy Tutorials/ Small Group Teaching/ Integrated learning	
SATURDAY	**Anatomy** - Tutorials/ Small Group Teaching/ Integrated learning.		Community Medicine	**11am to 12noon** 1st wk- Physiology 3rd wk - Biochemistry 4th wk- Anatomy	12noon to 1pm **Lunch Break**		**1pm to 4pm** 1st wk- Physiology 3rd wk - Biochemistry 4th wk- Anatomy		

22/06/22

VICE PRINCIPAL

Class & Teacher topic timetable

Velammal Medical College Hospital and Research Institute
Department of Biochemistry
M.B.B.S., Theory Teaching schedule –2022

Date	Day	Time	Competency	Theory	Faculty
1.4.2022	Friday	10.00-11.00	BI 1.1	Introduction to Biochemistry	Dr PKM
4.4.2022	Monday	9.00-11.00	BI 1.1	Introduction to Biochemistry	Dr PKM
				Fluid mosaic model, Transport across cell membrane (Instructions for SDL)	Dr KS /Dr AH
5.4.2022	Tuesday	8.00-9.00	BI 3.1	Monosaccharide, Disaccharide, polysaccharide medical importance	Dr KS
6.4.2022	Wednesday	10.00-11.00	BI 3.1	Polysaccharides - Heteropolysaccharides	Dr KS
8.4.2022	Friday	10.00-11.00	BI 4.1	Classification: Biological functions and properties of lipids & fatty acids	Dr MTS
9.4.2022	Saturday		BI 4.1	Google form: MCQ test from 12th std portion	
11.4.2022	Monday	9.00-11.00	BI 4.1	Chemistry of lipids – Compound lipids: Phospholipid	Dr MTS

				SDL Discussion (1-4)	ALL Faculty
12.4.2022	Tuesday	8.00-9.00	BI 5.1	Classification of aminoacids and their properties	Dr AH
13.4.2022	Wednesday	10.00-11.00	BI5.1 & 5.2	Structure of Protein, Structure & Function- Hb, Mb	Dr AH
18.4.2022	Monday	9.00-11.00	BI 1.1 BI3.1 BI4.1	Internal Assessment - I: Cell Membrane Transport, Chemistry of Carbohydrates, lipids, aminoacids & Protein	All Faculty
19.4.2022	Tuesday	8.00-9.00	BI 6.5	1. Introduction of vitamins, Vit A & walds visual cycle	Dr AR
20.4.2022	Wednesday	10.00-11.00	BI 6.5	Vitamin D	Dr AR
22.4.2022	Friday	10.00-11.00	BI6.5	Vitamin deficiency leading to anemia	Dr MV
26.4.2022	Tuesday	8.00-9.00	BI2.1	Enzyme classifications and coenzymes, cofactors	Dr PKM
27.4.2022	Wednesday	10.00-11.00	BI2.1 BI2.3	Properties & Mechanism of action of Enzymes	Dr AH
29.4.2022	Friday	10.00-11.00	BI2.1 BI2.3	Properties & Mechanism of action of Enzymes	Dr AH
5/2/2022	Monday	4.00-5.00 PM	BI6.5 BI6.9	Small Group Discussion - Vitamin A	DR.K.Suganthy/ DR.A.Hariharan/ All PG
4/5/2022	Wednesday	10.00 - 11.00 AM	BI2.3	Factors affecting enzyme action & Kinetics	DR.K.Suganthy
5/4/2022	Wednesday	4.00 - 5.00 PM	BI6.5	Small Group Discussion - Vitamin D	DR.K.Suganthy/ DR.A.Hariharan/ All PG

6/5/2022	Friday	9.00-10.00 AM	BI2.4	Inhibition of enzyme activity, Enzyme Inhibitors: drugs, poisons & Regulation & Inhibition of enzyme activity	DR.K.Suganthy
6/5/2022	Friday	4.00 - 5.00 PM	BI6.5	Small Group Discussion - Vitamin B1	DR.K.Suganthy/ DR.A.Hariharan/ All PG
7/5/2022	Saturday	2.00-4.00 PM	BI6.5	Case based discussion - Vitamin	All Faculty
5/9/2022	Monday	4.00-5.00 PM	BI6.5	Small Group Discussion - Vitamin B12 Folic acid	DR.K.Suganthy/ Dr.Mamatha T Shenoy/ All PG
10/5/2022	Tuesday	8.00 - 9.00 AM	BI2.5 BI2.6 BI2.7	Clinical Enzymology	DR.A.Hariharan
11/5/2022	Wednesday	10.00 - 11.00 AM	BI2.5 BI2.6 BI2.7	Diagnostic use of enzymes	DR.A.Hariharan
11/5/2022	Wednesday	4.00-5.00 PM	BI2.3	Small Group Discussion - Mechanism of action of enzymes	DR.K.Suganthy/ Dr.Mamatha T Shenoy/ All PG
13/05/2022	Friday	10.00 - 11.00 AM		(Integrated Teaching: MI [Anat, Physio, Biochem, Cardio])	All Faculty
13/05/2022	Friday	4.00 - 5.00 PM	BI2.4	Small Group Discussion - Enzyme inhibition	DR.K.Suganthy/ Dr.Mamatha T Shenoy/ All PG
16/05/2022	Monday	9.00 - 11.00 AM		Enzymology - Quiz/ Seminar presentation	All Faculty
16/05/2022	Monday	4.00-5.00 PM		Small Group Discussion - Isoenzymes &clinical importance	All Faculty
17/05/2022	Tuesday	8.00 - 9.00 AM	BI6.1	Overview of metabolism	Dr. K.Suganthy
18/05/2022	Wednesday	10.00 - 11.00 AM	BI6.6	Biological Oxidation	Dr.Mamatha T Shenoy
18/05/2022	Wednesday	4.00-5.00 PM	BI2.1	Vitamin - Quiz	DR.K.Suganthy/ Dr.Asothai/ All PG

20/05/2022	Friday	10.00 - 11.00 AM	BI6.6	ETC	Dr.Mamatha T Shenoy
20/05/2022	Friday	4.00-5.00 PM	BI2.3	Small Group Discussion - Factors affecting enzyme action	DR.K.Suganthy/ Dr.Asothai/ All PG
21/05/2022	Saturday	2.00 - 4.00 PM		Internal Assessment II : {Vitamins & Enzymology, Isoenzymes) Formative feed back session	All Faculty
				IAT -2 paper distribution /Viva voce	
				SDL	
30/05/2022	Monday	9.00-11 AM		Assignment	All Faculty
31/05/2022	Tuesday	8.00-9.00AM		Oxidative phosphorylation & inhibitors	Dr.Mamatha T Shenoy
3/6/2022	Friday	10.00 - 11.00 AM	BI 3.4	Glycolysis	Dr KS
		9.00 - 11.00 AM	BI 3.4	Fate of pyruvate & TCA cycle	Dr.KS
		4.00-5.00 PM	BI 3.4	Gluconeogenesis	Dr AH
6/6/2022	Monday	4.00-5.00 PM	BI 6.6	ETC/oxidative phosphorylation	DR.MTS
7/6/2022	Tuesday	8.00 - 9.00 AM	BI 3.4	Glycogen metabolism	Dr AH
8/6/2022	Wednesday	10.00 - 11.00 AM	BI 3.4	Glycogen storage disorder	Dr AH
10/6/2022	Friday	9.00-10.00AM	BI 3.4	HMP pathway	DR.MTS
		9.00 - 11.00 AM	BI 3.5	Fructose and galatose metabolism / Uronic acid and Polyol pathway	DR.MTS
13/06/2022	Monday	4.00 - 5.00 PM	BI 3.4	Glycolysis & Fate of pyruvate	Dr AR
14/06/2022	Tuesday	8.00 - 9.00 AM	BI 4.2	Digestion & absorption of lipids	Dr AR
15/06/2022	Wednesday	10.00 - 11.00 AM	BI 4.2	Oxidation of fatty acids	Dr AH
17/06/2022	Friday	10.00 - 11.00 AM	BI 4.2	Oxidation of fatty acids	Dr AH
18/06/2022	Saturday	10.00 AM - 12.00 PM	Revision IAT - BO,ETC Carbohydrate metabolism		All Faculty

		1.00 - 4.00 PM	IIIrd Internal Assessment		All Faculty
		9.00 - 11.00 AM	BI 4.2	PBL - Von Gierks , Galactosemia	All Faculty
20/06/2022	Monday	4.00-5.00 PM	BI 3.4	Glycogen metabolism & Glycogen storage disorder	Dr AH
21/06/2022	Tuesday	8.00 - 9.00 AM	BI 4.2	Biosynthesis of fatty acid	DrAR
22/06/2022	Wednesday	10.00 - 11.00 AM	BI 4.2	Cholesterol synthesis, excretion & Fate of Cholesterol	Dr MV
24/06/2022	Friday	10.00 - 11.00 AM	BI 4.2	Ketone body metabolism	Dr.KS
		9.00 - 11.00 AM	BI 4.2	SDL: Lipases- Types & Functions & Lipoprotein metabolism-Chylomicrons	DR.MTS
27/06/2022	Monday	4.00-5.00 PM	BI 4.2	Fatty acid synthase complex and Oxidation of fatty acids	Dr.AH
28/06/2022	Tuesday	8.00 - 9.00 AM	BI 4.2	Lipoprotein metabolism-VLDL, IDL and LDL	DR.MTS
29/06/2022	Wednesday	10.00 - 11.00 AM	BI 4.3	Lipoprotein metabolism- HDL	Dr MV
1/7/2022	Friday	10.00-11.00 AM	BI 4.3, BI 4.4 & BI 4.7	Lipoprotein disorders ,atherosclerosis, Lipid profile	Dr.AH
4/7/2022	Monday	9.00-11.00AM		Students seminar	All Faculty
5/7/2022	Tuesday	8.00-9.00 AM	BI 4.2	Fatty Liver, Lipotropic factors	Dr.AR
6/7/2022	Wednesday	10.00-11.00AM	BI 4.6	Eicosanoids metabolism	Dr.MV
8/7/2022	Friday	10.00-11.00 AM	BI 4.2	Triglyceride metabolism & Phospholipids metabolism	Dr.KS
11/7/2022	Monday	9.00-11.00AM	BI 3.9 & BI 6.1	Blood glucose regulation, Fasting & Fed state	Dr.KS
12/7/2022	Tuesday	8.00-9.00 AM	BI4.3	Lipid storage disorders	Dr.AR
13/07/22	Wednesday	10.00-11.00AM	BI 7.6 , BI 7.7	Anti-oxidant and its role in disease	Dr.KS
15/07/22	Friday	10.00-11.00 AM	BI 6.11	Hemoglobin chemistry	Dr.MV

16/07/22	Saturday	11.00 AM-12.00 NOON	BI 4	Revision - Lipid metabolism	All Faculty
16/07/22	Saturday	1.00-4.00 PM	BI 4	IVth Internal Assessment Exam - Theory (Lipid metabolism)	All Faculty
18/07/22	Monday	9.00-11.00AM	BI 3.10	DM & lab investigations/chart discussion - OGTT	Dr.AH
19/07/22	Tuesday	8.00-9.00 AM	BI 6.11	Heme synthesis & regulation, Heme containing protein and porphyria	Dr.MTS
20/07/22	Wednesday	10.00-11.00AM	BI 6.11	Heme breakdown	Dr.MTS
22/07/22	Friday	10.00-11.00 AM	BI 6.12	Hemoglobinopathy	Dr.MV
25/07/22	Monday	9.00-11.00AM	BI 11.17 & BI 6.14	Differential Diagnosis of Jaundice & LFT/chart discussion - LFT	Dr.KS
26/07/22	Tuesday	8.00-9.00 AM	BI 8.1	Nutrition -RQ, BMR, SDA, Balanced diet, calculation of energy requirment	Dr.AR
27/07/22	Wednesday	10.00-11.00AM	BI 8.1, BI 8.2	Nutritive value of Carbohydrates, Lipids and proteins Dietary fiber, Parental nutrition and PEM	Dr.MV
29/07/22	Friday	10.00-11.00 AM	BI 8.4	Glycemic index, Obesity and Metabolic syndrome	Dr.MV
1/8/2022	MONDAY	9.00-11.00AM	BI 6.2, BI 6.3	Nucleic acid chemistry, Purine synthesis, Salvage pathway & regulation	Dr.KS
2/8/2022	TUESDAY	8.00-9.00 AM	BI 6.2, BI 6.3	Purine Degradation, Gout	Dr.AR
3/8/2022	WEDNESDAY	10.00-11.00AM	BI 6.2, BI 6.3	Pyrimidine metabolism	Dr.MTS
5/8/2022	FRIDAY	10.00-11.00 AM	BI 7.1, BI 7.2	Cell cycle and modes of inheritance	Dr.MTS
8/8/2022	MONDAY	9.00-10.00AM	BI 7.1	DNA Structure	Dr.AH
8/8/2022	MONDAY	10.00 - 11.00 AM	BI 7.2	Replication	Dr.AH

9/8/2022	TUESDAY	8.00-9.00 AM	BI 7.1, BI 7.2	Transcription & Types of RNA/ Post transcriptional modification	Dr.KS
10/8/2022	WEDNESDAY	10.00-11.00AM	BI 7.1, BI 7.2	Transcription & Types of RNA/ Post transcriptional modification	Dr.KS
12/8/2022	FRIDAY	10.00-11.00 AM	BI 7.2	Genetic code and Translation	Dr.MV
16/08/22	TUESDAY	8.00-9.00 AM	BI 7.2	Translation & Post translational modification	Dr.MV
17/08/22	WEDNESDAY	10.00-11.00AM	Practical revision, OSPE and chart discussion		Dr.MTS Dr.MV
19/08/22	FRIDAY	10.00-11.00 AM	Revision paper-1		All Faculty
22/08/22	MONDAY	9.00-10.00AM	Centralized Internal Assessment Exam - Anatomy		
23/08/22	TUESDAY	8.00-9.00 AM	Centralized Internal Assessment Exam - Physiology		
24/08/22	WEDNESDAY	9.00 AM-12.00 NOON	Centralized Internal Assessment Exam - Biochemistry		All Faculty
25/08/22 to 27/08/22	Centralized Internal Assessment Practical Exam				All Faculty
29/08/22	MONDAY	9.00-10.00AM	Community Medicine Exam		
30/08/22	TUESDAY	8.00-9.00 AM	BI 7.3	Regulation of gene expression & Operon concept	Dr.AH
31/08/22	WEDNESDAY	10.00-11.00AM	BI 7.3	Regulation of gene expression & Operon concept	Dr.AH
2/9/2022	Friday	10.00-11.00 AM	BI 7.3	Regulation of gene expression & Operon concept	Dr.AH
5/9/2022	Monday	9.00-11.00AM	BI 7.4	r DNA technology/SDL	Dr.KS
6/9/2022	Tuesday	8.00-9.00 AM	BI 7.4	Cloning, Gene therapy	Dr.AR
7/9/2022	Wednesday	10.00-11.00AM	BI 7.4	Blotting Technique	Dr.AH
9/9/2022	Friday	10.00-11.00 AM	BI 7.4	RFLP ,DNA finger printing, Sequencing, Micro array, FISH	Dr.KS
12/9/2022	Monday	9.00-11.00AM	BI 11.16	Electrophoresis	Dr.MTS/Dr.MV
13/09/22	Tuesday	8.00-9.00 AM	BI 6.8 BI 11.16	pH meter and buffer preparation	Dr.MTS/Dr.MV
14/09/22	Wednesday	10.00-11.00AM	BI 11.16	Blotting Technique	Dr.MTS/Dr.MV
16/09/22	Friday	10.00-11.00 AM	BI 11.16	Hemoglobin electrophoresis	Dr.MTS/Dr.MV

17/09/22	Saturday	11.00 AM-12.00 NOON	BI 11.16	SDS PAGE/post test	Dr.MTS/Dr.MV
17/09/22	Saturday	1.00-4.00 PM		Internal Assessment - VI	All faculty
19/09/22	Monday	9.00-11.00AM	BI 6.9	Minerals - Iron	Dr.KS
20/09/22	Tuesday	8.00-9.00 AM	BI 6.14	Integrated teaching - TFT	Dr.AR
21/09/22	Wednesday	10.00-11.00AM	BI 6.9	Minerals - Calcium and phosphorus	Dr.MV
23/09/22	Friday	10.00-11.00 AM	BI 6.9	Minerals - Mg, Copper, Zinc, selenium and fluoride	Dr.MTS
26/09/22	Monday	9.00-11.00AM	BI 6.14	RFT	Dr.AH
27/09/22	Tuesday	8.00-9.00 AM	BI 6.14	LFT	Dr.AR
28/09/22	Wednesday	10.00-11.00AM	BI 6.14	Gastric & pancreatic function test , Adrenal function test, CSF and body fluid analysis	Dr.AH
30/09/22	Friday	10.00-11.00 AM	BI 10.1 BI 10.2	Biochemistry of Cancer	Dr.MV
7/10/2022	Friday	10.00-11.00 AM	BI 5.3	Digestion and absorption of proteins	Dr.A.Hariharan
10/10/2022	Monday	9.00-11.00AM	BI 5.4	Transamination & Deamination & Urea cycle	Dr.Asothai/ Dr.K.Suganthy
11/10/2022	Tuesday	8.00-9.00 AM	BI 5.4	Aromatic Amino acid – Phenylalanine and Tyrosine Metabolism	Dr.Asothai
12/10/2022	Wednesday	10.00-11.00AM	BI 5.4	Aromatic Amino acid – Phenylalanine and Tyrosine Metabolism	Dr.Asothai
14/10/22	Friday	10.00-11.00 AM	BI 5.4	Tryptophan metabolism	Dr.K.Suganthy
17/10/22	Monday	9.00-11.00AM	BI 5.4	Sulphur containing Aminoacids & Glycine Metabolism	Dr.A.Hariharan/ Dr.M.Viveka
18/10/22	Tuesday	8.00-9.00 AM	BI 5.4	Arginine, Nitric oxide, Histidine, Glutamic acid, Polyamines	Dr.Asothai
19/10/22	Wednesday	10.00-11.00AM	BI 5.4	Branch chain amino acid & MSUD	Dr.K.Suganthy
21/10/22	Friday	10.00-11.00 AM	BI 5.4	IEM of amino acid metabolism	Dr.A.Hariharan
22/10/22	Saturday	11.00 AM-12.00 NOON	Revision		All Faculty
22/10/22	Saturday	1.00-4.00 PM	BI 5	Biochemistry IAT-IIV (Protein Metabolism)	All Faculty
25/10/22	Tuesday	8.00-9.00 AM	Answer paper discussion		Dr.A.Hariharan

26/10/22	Wednesday	10.00-11.00AM	BI 5	Plasma proteins	Dr.Mamatha T Shenoy
28/10/22	Friday	10.00-11.00 AM	BI 5	Plasma proteins	Dr.Mamatha T Shenoy
31/10/22	Monday	9.00-11.00AM	SDL – Protein Metabolism		All Faculty
1/11/2022	Tuesday	8.00- 9.00 AM	BI 7.5	Xenobiotics	Dr.K.Suganthy
2/11/2022	Wednesday	10.00- 11.00AM	BI 10.3,10.4 & 10.5	Immunology	Dr.Asothai
4/11/2022	Friday	10.00- 11.00 AM	BI 10.3,10.4 & 10.5	Immunology	Dr.Asothai
7/11/2022	Monday	9.00- 11.00AM	BI 6.7 & BI 6.8	Acid Base balance - revision	Dr.K.Suganthy/ Dr.Viveka
8/11/2022	Tuesday	8.00- 9.00 AM	BI 9.1 & 9.2	ECM and disease	Dr.A.Hariharan
9/11/2022	Wednesday	10.00-11.00AM	BI 9.3	Protein targeting and sorting with its associate disorders	Dr.M.Viveka
11/11/2022	Friday	10.00-11.00 AM		Case Discussion - Major Case	Dr.A.Hariharan
14/11/22	Monday	9.00-11.00AM	BI 6	Integration of Metabolism	Dr.Mamatha T Shenoy
15/11/22	Tuesday	8.00-9.00 AM		OSPE - calculations	Dr.Asothai
16/11/22	Wednesday	10.00-11.00AM	BI 10.5	Integrated teaching	Dr.A.Hariharan
18/11/22	Friday	10.00-11.00 AM	BI 5	VAC - IEM	All Faculty
19/11/22	Saturday	11.00 AM-5.00 PM	BI 5	VAC - IEM	All Faculty
21/11/22	Monday	9.00-11.00AM	BI 5	VAC - IEM	All Faculty
22/11/22	Tuesday	8.00-9.00 AM	BI 6.5	Class test - Vitamin A	All Faculty
23/11/22	Wednesday	10.00-11.00AM	BI 6.5	Class test - Vitamin D	
25/11/22	Friday	10.00-11.00 AM	BI 6.5	Class test - Folic acid and Vitamin B12	All Faculty
28/11/22	Monday	9.00 - 12.00 AM	Central Internal Assesment - II (theory) - Physiology		All Faculty

29/11/22	Tuesday	9.00 - 12.00 AM	Central Internal Assesment – II (theory) - Biochemistry	Dr.A.Hariharan
30/11/22	Wednesday	9.00 - 12.00 AM	Central Internal Assesment – II (theory) - Anatomy	Dr.Viveka M

Date	Day	Time	Theory Topic	Faculty
02-12-2022	Friday	10.00-11.00 AM	Revision - Glycolysis	Dr.K.Suganthy
05-12-2022	Monday	9.00-11.00 AM	Revision - Glyuconeogenesis & Glycogen metabolism	Dr.Mamatha T Shenoy
06-12-2022	Tuesday	8.00-9.00 AM	Revision- HMP pathway	Dr.A.Hariharan
07-12-2022	Wednesday	10.00-11.00 AM	Revision - Phenylalanine and tyrosine metabolism	Dr.Asothai
09-12-2022	Friday	10.00-11.00 AM	Revision - Methionine metabolism	Dr.M.Viveka
12-12-2022	Monday	9.00-11.00 AM	Revision - IEM	Dr.K.Suganthy
13-12-2022	Tuesday	8.00-9.00 AM	Revision - Vitamin A	Dr.Mamatha T Shenoy
14-12-2022	Wednesday	10.00-11.00 AM	Revision - Vitamin D	Dr.A.Hariharan
16-12-2022	Friday	10.00-11.00 AM	Revision - Folic acid and Vitamin B12	Dr.Asothai
17-12-2022	Saturday	11.00-12.00	Revision - Iron	Dr.M.Viveka
17-12-2022	Saturday	1.00-4.00 PM	Revision - ETC & oxidative phosphorylation	Dr.K.Suganthy
19-12-2022	Monday	9.00-11.00 AM	Revision - Blood glucose Regulation	Dr.Mamatha T Shenoy
20-12-2022	Tuesday	8.00-9.00 AM	Revision - Calcium	Dr.A.Hariharan
21-12-2022	Wednesday	10.00-11.00 AM	Revision - beta oxidation	Dr.Asothai
23-12-2022	Friday	10.00-11.00 AM	Revision - Fatty acid synthase complex	Dr.M.Viveka

26-12-2022	Monday			
27-12-2022	Tuesday			
28-12-2022	Wednesday			
29-12-2022	Thursday			
30-12-2022	Friday			
31-12-2022	Saturday	Model Exam		
02-01-2023	Monday	9.00-11.00 AM	Paper discussion	Dr.K.Suganthy
03-01-2023	Tuesday	8.00-9.00 AM	Revision- Biochemistry paper-I	Dr.Mamatha T Shenoy
04-01-2023	Wednesday	10.00-11.00 AM	Revision- Biochemistry paper-II	Dr.A.Hariharan

Velammal Medical College Hospital and Research Institute
Department of Biochemistry
M.B.B.S., Practical Teaching schedule –2022

Date	Day	BATCH	Competency	Theory	Faculty
05.04.2022 06.04.2022 07.04.2022	Tuesday Wednesday Thursday	Batch C Batch A Batch B	11.1 11.19	Introduction to laboratory and Biochemistry Practicals: Describe commonly used laboratory apparatus and equipments, good safe laboratory practice and waste disposal.	Dr MTS & MV & PGs Dr.PKM,Dr.AH& PGs Dr.KS, Dr.AR& PGs
11.04.2022 12.04.2022 13.04.2022	Tuesday Wednesday Thursday	Batch C Batch A Batch B	11.1	Clinical Biochemistry & Phlebotomy lab visit	ALL FACULTY
19.04.2022 20.04.2022 21.04.2022	Tuesday Wednesday Thursday	Batch C Batch A Batch B	3.1 3.8	Demonstration: Colour reactions of carbohydrates OSPE: Colour reactions of carbohydrates	Dr MTS & MV & PGs Dr.PKM,Dr.AH& PGs Dr.KS, Dr.AR& PGs
25.04.2022 26.04.2022 27.04.2022	Tuesday Wednesday Thursday	Batch C Batch A Batch B	11.3 11.4	Urine Analysis: Physical appearance Describe the chemical components of normal urine. Urine Analysis: Inorganic components, Urine strip test	Dr MTS & MV & PGs Dr.PKM,Dr.AH& PGs Dr.KS, Dr.AR
4.5.2022 5.5.2022	Wednesday Thursday	Batch A Batch B	6.5	Small Group Teaching: Vitamin A & D	Dr.PKM,Dr.AH& PGs Dr.KS, Dr.AR & PGs
10.5.2022 11.5.2022 12.5.2022	Tuesday Wednesday Thursday	Batch C Batch A Batch B	11.3	**Urine Analysis:** Organic Constituents **Demonstration :** Colour reactions of aminoacids & Precipitation reactions of Proteins	Dr MTS & MV & PGs Dr.PKM,Dr.AH& PGs Dr.KS, Dr.AR & PGs
17.5.2022 18.5.2022 19.5.2022	Tuesday Wednesday Thursday	Batch C Batch A Batch B	11.3	**Certification:** **1. Perform urine analysis to determine normal constituents** Physical Appearance Organic Constituents	Dr MTS & MV & PGs Dr.PKM,Dr.AH& PGs Dr.KS, Dr.AR & PGs

				Inorganic Constituents **OSPE:** colour reactions of carbohydrates & Amino Acids	
31.05.2022 1.06.2022 2.06.2022	Tuesday Wednesday Thursday	Batch C Batch A Batch B	11.4	**Abnormal urine analysis** (Benedict's Test, Heat Coagulation Test, Heller's Test, sulphosalicylic Acid Test, Rothera's Test)	Dr MTS & MV & PGs Dr.PKM,Dr.AH& PGs Dr.KS, Dr.AR & PGs
7/6/2022 8/6/2022 9/6/2022	Tuesday Wednesday Thursday	Batch C Batch A Batch B	BI 11.4, BI 11.5	Perform urine analysis to determine abnormal constituents: Discussion of Hays, Fouchets test, orthotolidine test **Demonstration:** IEM Screening: ferric chloride, DNPH, Bials test.	All Faculty& PG
14/06/2022 15/06/2022 16/06/2022	Tuesday Wednesday Thursday	Batch C Batch A Batch B	BI 11.2, BI 11.6	Identify abnormal constituents in urine, interpret the findings and correlate these with pathological states. (DKA)Demonstration: Principle of colorimetry & Spectrophotometry	All Faculty& PG
21/06/2022 22/06/2022 23/06/2022	Tuesday Wednesday Thursday	Batch C Batch A Batch B	BI 11.2 BI 11.8	Estimation of serum total protein Identify abnormal constituents in urine, interpret the findings and correlate these with pathological states. (Diabetic Nephropathy)	All Faculty& PG
28/06/2022 29/06/2022 30/06/2022	Tuesday Wednesday Thursday	Batch C Batch A Batch B	BI 11.9 BI 11.17	**Demonstration:** Demonstrate the estimation of serum Cholesterol, HDL Cholesterol, Triglycerides Basis and rationale of biochemical tests done: Dyslipidemia & MI.	All Faculty& PG
5/7/2022 6/7/2022 7/7/2022	Tuesday Wednesday Thursday	Batch C Batch A Batch B	BI 11.17	Basis and rationale of biochemical tests done: Diabetes. Demonstration: Estimation of glucose in plasma	All Faculty& PG
12/7/2022 13/07/22 14/07/22	Tuesday Wednesday Thursday	Batch C Batch A Batch B	Tutorials, practical, academic and assessment record correction		All Faculty& PG
19/07/22 20/07/22 21/07/22	Tuesday Wednesday Thursday	Batch C Batch A Batch B	BI 11.22 BI 11.4	Estimation of serum albumin & calculate A:G ratio Identify abnormal constituents in urine, interpret the findings and correlate these with pathological states. (Glomerulonephritis)	All Faculty& PG

26/07/22 27/07/22 28/07/22	Tuesday Wednesday Thursday	Batch C Batch A Batch B	BI 11.8	Estimation of albumin	All Faculty& PG
2/8/2022 3/8/2022 4/8/2022	Tuesday Wednesday Thursday	Batch C Batch A Batch B	11.7	Estimation of serum creatinine	All Faculty& PG
9/8/2022 10/8/2022 11/8/2022	Tuesday Wednesday Thursday	Batch C Batch A Batch B	11.3	Certification : Perform urine analysis to determine abnormal constituents creatinine clearance Basis and rationale of biochemical tests done: renal failure, nephrotic syndrome, edema	All Faculty& PG
16/08/22 17/08/22 18/08/22	Tuesday Wednesday Thursday	Batch C Batch A Batch B	IAT - II Practical Revision / Record correction		All Faculty& PG
25/08/22 to 27/08/22	Tuesday Wednesday Thursday	Batch C Batch A Batch B	Chart discussion		All Faculty& PG
30/08/22 31/08/22 1/9/2022	Tuesday Wednesday Thursday	Batch C Batch A Batch B	11.21	Estimation of urea Extension Activity for school students - National Nutritional Week 2022 Velammal Vidhyalaya, VBC	All Faculty& PG
6/9/2022 7/9/2022 8/9/2022	Tuesday Wednesday Thursday	Batch C Batch A Batch B	Revision		All Faculty& PG
13/09/22 14/09/22 15/09/22	Tuesday Wednesday Thursday	Batch C Batch A Batch B	BI 11.16	Demonstration of Serum protein electrophoresis	Dr.MTS/Dr.MV
20/09/22 21/09/22 22/09/22	Tuesday Wednesday Thursday	Batch C Batch A Batch B	BI 11.21	Estimation of urea	All Faculty& PG
27/09/22 28/09/22 29/09/22	Tuesday Wednesday Thursday	Batch C Batch A Batch B	BI 11.21	Estimation of creatinine and creatinine clearance/ RFT charts discussion	All Faculty& PG

4/10/2022 5/10/2022 6/10/2022	Tuesday Wednesday Thursday	Batch C Batch A Batch B	BI 11.12	Demonstrate the estimation of serum Bilirubin	All Faculty& PG
11/10/2022 12/10/2022 13/10/22	Tuesday Wednesday Thursday	Batch C Batch A Batch B	BI 11.16	Demonstration of chromatography	All Faculty& PG
18/10/22 19/10/22 20/10/22	Tuesday Wednesday Thursday	Batch C Batch A Batch B	BI 11.12	Demonstrate the estimation of serum bilirubin	All Faculty& PG
25/10/22 26/10/22 27/10/22	Tuesday Wednesday Thursday	Batch C Batch A Batch B	BI 11.11	Demonstration of calcium and phosphorus estimation	All Faculty& PG
1/11/2022 2/11/2022 3/11/2022	Tuesday Wednesday Thursday	Batch C Batch A Batch B	BI 11.17	Chart Discussion - LFT & RFT	
8/11/2022 9/11/2022 10/11/2022	Tuesday Wednesday Thursday	Batch C Batch A Batch B	Bi 11.17	Chart Discussion - ABG, OGTT & Others	All Faculty& PG
15/11/2022 16/11/2022 17/11/2022	Tuesday Wednesday Thursday	Batch C Batch A Batch B	BI 11.4	Practical Examination - Urine Analysis	
22/11/2022 23/11/2022 24/11/2022	Tuesday Wednesday Thursday	Batch C Batch A Batch B	Viva Voce - Vitamins		All Faculty& PG

Date	Day	Time	Topics	Faculty
01-12-2022	Thursday	11.00 AM -1.00PM	Batch B - Chart Discussion	All Faculty and PG
06-12-2022	Tuesday	11.00 AM -1.00PM	Batch C - Revision - Major Case - Glucose & Urea	All Faculty and PG

07-12-2022	Wednesday	11.00 AM -1.00PM	Batch A - Revision - Major Case - Glucose & Urea	All Faculty and PG
08-12-2022	Thursday	11.00 AM -1.00PM	Batch B - Revision - Major Case - Glucose & Urea	All Faculty and PG
13-12-2022	Tuesday	11.00 AM -1.00PM	Batch C - Revision - Major Case - Creatinine, T.Protein and Albumin	All Faculty and PG
14-12-2022	Wednesday	11.00 AM -1.00PM	Batch A - Revision - Major Case - Creatinine, T.Protein and Albumin	All Faculty and PG
15-12-2022	Thursday	11.00 AM -1.00PM	Batch B - Revision - Major Case - Creatinine, T.Protein and Albumin	All Faculty and PG
20-12-2022	Tuesday	11.00 AM -1.00PM	Batch C - Revision - Urine analysis	All Faculty and PG
21-12-2022	Wednesday	11.00 AM -1.00PM	Batch A - Revision - Urine analysis	All Faculty and PG
22-12-2022	Thursday	11.00 AM -1.00PM	Batch B - Revision - Urine analysis	All Faculty and PG
27-12-2022	Tuesday	11.00 AM -1.00PM		
28-12-2022	Wednesday	11.00 AM -1.00PM		
29-12-2022	Thursday	11.00 AM -1.00PM	Model Exam	
03-01-2023	Tuesday	11.00 AM -1.00PM	Batch C - OSPE discussion	All Faculty and PG
04-01-2023	Wednesday	11.00 AM -1.00PM	Batch A - OSPE discussion	All Faculty and PG
05-01-2023	Thursday	11.00 AM -1.00PM	Batch B - OSPE discussion	All Faculty and PG

Teaching Methodologies

VELAMMAL MEDICAL COLLEGE HOSPITAL AND RESEARCH INSTITUTE

Department of Biochemistry

Lecture plan, Schedule and Methodology

MBBS First year Batch of: 2021-2022

S.No.	Name of the Lecture	Teaching Learning method	Assessment method
1.	Describe the molecular and functional organization of a cell and its sub cellular components.	Lecture, Small group Discussion	Written assessment/ Viva voce
2.	Explain fundamental concepts of enzyme, isoenzyme, alloenzyme, coenzyme & co-factors. Enumerate the main classes of IUBMB nomenclature	Lecture, case discussion	Written assessment/ Viva voce
3.	Observe the estimation of SGOT & SGPT	Demonstration	Viva voce
4.	Describe and explain the basic principles of enzyme activity	Lecture, case discussion	Written/ Viva voce
5.	Describe and discuss enzyme inhibitors as poisons and drugs and as therapeutic enzymes	Lecture, Small group discussion	Written/Viva voce
6.	Describe and discuss the clinical utility of various serum enzymes as markers of pathological conditions.	Lecture, Small group discussion	Written/Viva voce
7.	Discuss use of enzymes in laboratory investigations (Enzyme-based assays)	Lecture, Small group discussion	Written/ Viva voce
8.	Interpret laboratory results of enzyme activities & describe the clinical utility of various enzymes as markers of pathological conditions.	Lecture, Small group discussion, DOAP sessions	Written/ Viva voce

9.	Discuss and differentiate monosaccharides, di-saccharides and polysaccharides giving examples of main carbohydrates as energy fuel, structural element and storage in the human body	Lecture, Small group discussion	Written/Viva voce
10.	Describe the processes involved in digestion and assimilation of carbohydrates and storage.	Lecture, Small group discussion	Written/Viva voce
11.	Describe and discuss the digestion and assimilation of carbohydrates from food.	Lecture, Small group discussion	Written/Viva voce
12.	Define and differentiate the pathways of carbohydrate metabolism, (glycolysis, gluconeogenesis, glycogen metabolism, HMP shunt).	Lecture, Small group discussion	Written/Viva voce
13.	Describe and discuss the regulation, functions and integration of carbohydrate along with associated diseases/disorders.	Lecture, Small group discussion	Written/Viva voce
14.	Describe and discuss the concept of TCA cycle as a amphibolic pathway and its regulation.	Lecture, Small group discussion	Written/Viva voce
15.	Describe the common poisons that inhibit crucial enzymes of carbohydrate metabolism (eg; fluoride, arsenate)	Lecture, Small group discussion	Written/Viva voce
16.	Discuss and interpret laboratory results of analytes associated with metabolism of carbohydrates.	Lecture, Small group discussion	Written/Viva voce
17.	Discuss the mechanism and significance of blood glucose regulation in health and disease.	Lecture, Small group discussion	Written/Viva voce
18.	Interpret the results of blood glucose levels and other laboratory investigations related to disorders of carbohydrate metabolism.	Lecture, Small group discussion	Written/Viva voce
19.	Describe and discuss main classes of lipids (Essential/non-essential fatty acids, cholesterol and hormonal steroids, triglycerides, major phospholipids and sphingolipids) relevant to human system and their major functions.	Lecture, Small group discussion	Written/Viva voce
20.	Describe the processes involved in digestion and absorption of dietary lipids and also the key features of their metabolism	Lecture, Small group discussion	Written/ Viva voce

21.	Explain the regulation of lipoprotein metabolism & associated disorders.	Lecture, Small group discussion	Written/ Viva voce
22.	Describe the structure and functions of lipoproteins, their functions, interrelations & relations with atherosclerosis	Lecture, Small group discussion	Written/ Viva voce
23.	Interpret laboratory results of analytes associated with metabolism of lipids	Lecture, Small group discussion	Written/ Viva voce
24.	Describe the therapeutic uses of prostaglandins and inhibitors of eicosanoid synthesis.	Lecture, Small group discussion	Written/ Viva voce
25.	Interpret laboratory results of analytes associated with metabolism of lipids.	Lecture, Small group discussion	Written/ Viva voce
26.	Describe and discuss structural organization of proteins.	Lecture, Small group discussion	Written/ Viva voce
27.	Describe and discuss functions of proteins and structure-function relationships in relevant areas eg, hemoglobin and selected hemoglobinopathies	Lecture, Small group discussion	Written/ Viva voce
28.	Describe the digestion and absorption of dietary proteins.	Lecture, Small group discussion	Written/ Viva voce
29.	Describe common disorders associated with protein metabolism.	Lecture, Small group discussion	Written/ Viva voce
30.	Interpret laboratory results of analytes associated with metabolism of proteins.	Lecture, Small group discussion	Written/ Viva voce
31.	Discuss the metabolic processes that take place in specific organs in the body in the fed and fasting states.	Lecture, Small group discussion	Written/ Viva voce
32.	Describe and discuss the metabolic processes in which nucleotides are involved.	Lecture, Small group discussion	Written/ Viva voce
33.	Describe the common disorders associated with nucleotide metabolism.	Lecture, Small group discussion	Written/ Viva voce
34.	Discuss the laboratory results of analytes associated with gout & Lesch Nyhan syndrome.	Lecture, Small group discussion	Written/ Viva voce

35.	Describe the biochemical role of vitamins in the body and explain the manifestations of their deficiency	Lecture, Small group discussion	Written/ Viva voce
36.	Describe the biochemical processes involved in generation of energy in cells.	Lecture, Small group discussion	Written/ Viva voce
37.	Describe the processes involved in maintenance of normal pH, water & electrolyte balance of body fluids and the derangements associated with these.	Lecture, Small group discussion	Written/ Viva voce
38.	Discuss and interpret results of Arterial Blood Gas (ABG) analysis in various disorders.	Lecture, Small group discussion	Written/ Viva voce
39.	Describe the functions of various minerals in the body, their metabolism and homeostasis.	Lecture, Small group discussion	Written/ Viva voce
40.	Enumerate and describe the disorders associated with mineral metabolism.	Lecture, Small group discussion	Written/ Viva voce
41.	Describe the functions of haem in the body and describe the processes involved in its metabolism and describe porphyrin metabolism.	Lecture, Small group discussion	Written/ Viva voce
42.	Describe the major types of haemoglobin and its derivatives found in the body and their physiological/ pathological relevance.	Lecture, Small group discussion	Written/ Viva voce
43.	Describe the functions of the kidney, liver, thyroid and adrenal glands.	Lecture, Small group discussion	Written/ Viva voce
44.	Describe the tests that are commonly done in clinical practice to assess the functions of these organs (kidney, liver, thyroid and adrenal glands).	Lecture, Small group discussion	Written/ Viva voce
45.	Describe the abnormalities of kidney, liver, thyroid and adrenal glands.	Lecture, Small group discussion	Written/ Viva voce
46.	Describe the structure and functions of DNA and RNA and outline the cell cycle.	Lecture, Small group discussion	Written/ Viva voce
47.	Describe the processes involved in replication & repair of DNA and the transcription & translation mechanisms.	Lecture, Small group discussion	Written/ Viva voce

48.	Describe gene mutations and basic mechanism of regulation of gene expression.	Lecture, Small group discussion	Written/ Viva voce
49.	Describe applications of molecular technologies like recombinant DNA technology, PCR in the diagnosis and treatment of diseases with genetic basis.	Lecture, Small group discussion	Written/ Viva voce
50.	Describe the role of xenobiotics in disease	Lecture, Small group discussion	Written/ Viva voce
51.	Describe the anti-oxidant defence systems in the body.	Lecture, Small group discussion	Written/ Viva voce
52.	Describe the role of oxidative stress in the pathogenesis of conditions such as cancer, complications of diabetes mellitus and atherosclerosis.	Lecture, Small group discussion	Written/ Viva voce
53.	Discuss the importance of various dietary components and explain importance of dietary fibre.	Lecture, Small group discussion	Written/ Viva voce
54.	Describe the types and causes of protein energy malnutrition and its effects.	Lecture, Small group discussion	Written/ Viva voce
55.	Provide dietary advice for optimal health in childhood and adult, in disease conditions like diabetes mellitus, coronary artery disease and in pregnancy.	Lecture, Small group discussion	Written/ Viva voce
56.	Describe the causes (including dietary habits), effects and health risks associated with being overweight/ obesity.	Lecture, Small group discussion	Written/ Viva voce
57.	Summarize the nutritional importance of commonly used items of food including fruits and vegetables.(macro-molecules & its importance)	Lecture, Small group discussion	Written/ Viva voce
58.	List the functions and components of the extracellular matrix (ECM).	Lecture, Small group discussion	Written/ Viva voce
59.	Discuss the involvement of ECM components in health and disease.	Lecture, Small group discussion	Written/ Viva voce
60.	Describe protein targeting & sorting along with its associated disorders.	Lecture, Small group discussion	Written/ Viva voce
61.	Describe the cancer initiation, promotion oncogenes & oncogene activation. Also focus on p53 & apoptosis	Lecture, Small group discussion	Written/ Viva voce

62.	Describe various biochemical tumor markers and the biochemical basis of cancer therapy.	Lecture, Small group discussion	Written/ Viva voce
63.	Describe the cellular and humoral components of the immune system & describe the types and structure of antibody	Lecture, Small group discussion	Written/ Viva voce
64.	Describe & discuss innate and adaptive immune responses, self/non-self recognition and the central role of T-helper cells in immune responses.	Lecture, Small group discussion	Written/ Viva voce
65.	Describe antigens and concepts involved in vaccine development.	Lecture, Small group discussion	Written/ Viva voce
66.	Describe commonly used laboratory apparatus and equipments, good safe laboratory practice and waste disposal.	Lecture, Small group discussion	Written/ Viva voce
67.	Describe the preparation of buffers and estimation of pH.	Lecture, Small group discussion	Written/ Viva voce
68.	Describe the chemical components of normal urine.	Lecture, Small group discussion	Written/ Viva voce
69.	Perform urine analysis to estimate and determine normal and abnormal constituents	DOAP session	Skill assessment
70.	Describe screening of urine for inborn errors & describe the use of paper chromatography	Lecture, Small group discussion	Written/ Viva voce
71.	Describe the principles of colorimetry	Lecture, Small group discussion	Written/ Viva voce
72.	Demonstrate the estimation of serum creatinine and creatinine clearance	Practical	Skills assessment
73.	Demonstrate estimation of serum proteins, albumin and A:G ratio	Practical	Skills assessment
74.	Demonstrate the estimation of serum total cholesterol and HDL-cholesterol	Practical	Skills assessment
75.	Demonstrate the estimation of triglycerides	Practical	Skills assessment
76.	Demonstrate estimation of calcium and phosphorous	Practical	Skills assessment
77.	Demonstrate the estimation of serum bilirubin	Practical	Skills assessment

78.	Demonstrate the estimation of SGOT/ SGPT	Practical	Skills assessment
79.	Demonstrate the estimation of alkaline phosphatase	Practical	Skills assessment
80.	Describe & discuss the composition of CSF	Lecture, Small group discussion	Written/ Viva voce
81.	Observe use of commonly used equipments/techniques in biochemistry laboratory including: •pH meter •Paper chromatography of amino acid •Protein electrophoresis •TLC, PAGE •Electrolyte analysis by ISE •ABG analyzer •ELISA •Immunodiffusion •Autoanalyser •Quality control •DNA isolation from blood/ tissue	Demonstration	Skill assessment
82.	Explain the basis and rationale of biochemical tests done in the following conditions: - diabetes mellitus, - dyslipidemia, - myocardial infarction, - renal failure, gout, - proteinuria, - nephrotic syndrome, - edema, - jaundice, liver diseases, pancreatitis, disorders of acid- base balance, - thyroid disorders.	Lecture, Small group discussion	Written/ Viva voce
83.	Discuss the principles of spectrophotometry.	Lecture, Small group discussion	Written/ Viva voce
84.	Outline the basic principles involved in the functioning of instruments commonly used in a biochemistry laboratory and their applications.	Lecture, Small group discussion	Written/ Viva voce
85.	Identify abnormal constituents in urine, interpret the findings and correlate these with pathological states.	DOAP sessions	Skill assessment
86.	Demonstrate estimation of glucose, creatinine, urea and total protein in serum.	DOAP sessions	Skill assessment

87.	Calculate albumin: globulin (AG) ratio and creatinine clearance	Lecture, Small group discussion	Written/ Viva voce
88.	Calculate energy content of different food Items, identify food items with high and low glycemic index and explain the importance of these in the diet	Lecture, Small group discussion	Written/ Viva voce
89.	Enumerate advantages and/or disadvantages of use of unsaturated, saturated and trans fats in food.	Lecture, Small group discussion	Written/ Viva voce

STUDY MATERIAL

1. Case based scenarios with questions
2. Wall charts
3. E poster
4. Working models
5. MCQ questions
6. Viva questions
7. 2 mark questions
8. Basic laboratory Instruments
9. University Questions

TEXTBOOK RECOMMENDED:

1. Textbook of Biochemistry for Medical Students – DM Vasudevan & Sreekumari S
2. Biochemistry – U.Satyanarayana & U.Chankrapani
3. Integrated Textbook of Biochemistry – Indumati V and Sowbhagya Lakshmi
4. Biochemistry – Lippincott's

REFERENCE BOOKS:

1. Harper's Illustrated Biochemistry – Victor W. Rodwell
2. Essential of Biochemistry – Pankaja Naik
3. Biochemistry practical manual – Soundravally Rjendiran
4. Manual of Practical Biochemistry – Anju Jain
5. Manual of Practical Biochemistry for MBBS – S K Gupta
6. Manual of Practical Medical Biochemistry – Evangeline Jones

E-JOURNAL:

1. Science
2. Nature Medicine
3. Nature Genetics
4. Annual Review of Biochemistry
5. Clinical Chemistry
6. The journal of Biological Chemistry
7. Proceedings of National Academy of Sciences of the United States of America (PNAS)
8. Public Library of Sciences (PLOS) publications
9. Journal of Clinical Investigation (JCI)
10. Indian Journal of Clinical Biochemistry.

E-BOOKS:

1. Harper's Illustrated Biochemistry – Victor W. Rodwell
2. Essential of Biochemistry – Pankaja Naik

Electronic material:

1.PPTs

2. Web link for online stimulation based learning.

3.Videos.

4.Animation

Internal Assessment Question Paper:

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DEPARTMENT OF BIOCHEMISTRY,

1st M.B.B.S 2021-2022 Batch

I Internal AssesmentExamination

I Essay:15X1=15

1. Following evidence of fetal distress at 34th week of gestation, a caesarean section was performed and a male baby was delivered. At birth the baby weighed 1.2kg and presented with tachypnoea (respiratory rate >70/min) and cyanosis. Radiological examination showed ground glass appearance.

    a. What is the most probable diagnosis? (1 mark)

    b. State the underlying biochemical defect in this condition. (2 marks)

    c. How do you diagnose this condition in the antenatal period? (2 marks)

    d. Enumerate the different types of phospholipids and discuss their biological significance. (10 marks)

II. Short Notes:5X5=25

1. Define and enumerate the types of heteropolysaccharides. Write their chemical composition, location and biological functions.
2. Explain the structure & organization of protein with suitable examples.
3. Define & Classify Active Transport Mechanisms. Explain the different types with suitable examples.
4. Draw a neat labelled diagram and explain the properties of Plasma membrane, proposed by Singer & Nicolson.
5. Classify Proteins with two suitable examples.

MCQ Questions:

1. The following amino acids does not exhibit optical isomerism
    a) Glycine
    b) Alanine
    c) Leucine
    d) Valine
2. At isoelectric point, amino acids exist as
    a) Anions
    b) Cations
    c) Zwitter ions
    d) None of the above
3. Bacteria are engulfed by the following process
    a) phagocytosis
    b) pinocytosis
    c) exocytosis
    d) all the above
4. Ceramide is made up of
    a) Sphingosine + fatty acids
    b) Glycerol + fatty acids
    c) Sphingosine + Glycerol
    d) None of above
5. Cellulose has glucose units linked by
    a) β-1,4 linkage
    b) α-1,4 linkage
    c) β-1,6 linkage
    d) None of above
6. The following is taken as the reference molecule to represent D-L isomerism
    a) Glucose
    b) Fructose
    c) Ribose
    d) Glyceraldehyde.
7. The following polysaccharide is the chief constituent of dietary fibre
    a) Starch
    b) Glycogen
    c) Cellulose
    d) None of the above
8. Transmembrane proteins serve as
    a) Ion channels
    b) Carriers
    c) Receptors
    d) All the above
9. The following GAG does not contain uronic acid
    a) Hyaluronic acid
    b) chondroitin sulphate
    c) dermatansulphate
    d) Keratansulohate
10. Naturally occuring fatty acids mostly contain
    a) Even no of carbons
    b) Odd no of carbons
    c) Both are equal
    d) None of the above
11. The conversion of UFA to SFA occurs through a process known as
    a) Halogenation
    b) Hydrogenation
    c) Detergent formation
    d) None of the above
12. The enzyme involved in the synthesis of prostaglandins is
    a) Cyclooxygenase
    b) Lipoxygenase
    c) Dehydrogenase
    d) None of the above
13. Cell organelle responsible for modifying and packaging proteins is
    a) Miochandria
    b) Nucleus
    c) Golgi Complex
    d) Lysosomes
14. Which of the following organelle has DNA?
    a) Miochandria
    b) Nucleus
    c) Golgi Complex
    d) Lysosomes
15. Which is the ketogenic aminoacid?
    a) Alanine
    b) Glutamic acid
    c) Leucine
    d) Aspartic acid
16. Indole ring is present in:
    a) Arginine
    b) Tryptophan
    c) Histidine
    d) Proline
17. Which of the following contains a beta giycosidic linkage?
    a) Heparin
    b) Glycogen
    c) Cellulose
    d) Starch
18. A pair of sugars differing from each other in the functional group is called:
    a) Anomers
    b) Epimers
    c) Isomers
    d) Stereoisomers

19. Which of the following is not present in vegetable oil?
    a) Cholesterol
    b) Linoleic acid
    c) Oleic acid
    d) Stearic acid
20. Which of the following is a dietary essential?
    a) Oleic acid
    b) Palmitic acid
    c) Linoleic acid
    d) Stearic acid

VELAMMAL MEDICAL COLLEGE & RESEARCH INSTITUTE
DEPARTMENT OF BIOCHEMISTRY
II INTERNAL ASSESSMENT TEST MBBS 2021-22Batch
Second Internal Assessment
Topic: Vitamins & Enzymology

Date: 21.05.2022 **Time: 1 – 4 PM** **Total Marks: 100**

I. Essay: **15 X 2 = 30 M**

1. Define enzyme. Classify enzymes with suitable example. Describe the various factors affecting enzymeaction. Add a note on allosteric regulation (1+6+5+3)
2. A 6 yrs old child was brought to the hospital with complaints of slow growth and pain in bones. On examination, he had frontal bossing, bowing of legs and swelling of costochondral junction. Laboratory results were: Serum calcium: 8.2 mg/dL, serum phosphorus: 2.8 mg/dL and PTH is elevated.
    i. What is the likely diagnosis? (1M)
    ii. Why serum calcium and phosphorus is decreased in this condition? (1M)
    iii. Justify why this vitamin is a hormone. (2M)
    iv. Describe the chemistry, sources, metabolism, RDA and biochemical role of this Vitamin. (1M + 1M + 3M + 1M + 5M)

II. Short Notes: **5 X 10 = 50 M**

1. Mechanism of action of enzyme.
2. Types of enzyme inhibition with suitable examples.
3. Wald's Visual Cycle
4. Biological Functions of vitamin C.
5. A 60 year old man was brought to the emergency, with severe chest pain radiating towards left shoulder, breathlessness, vomiting and profused sweating. His ECG shows ST segment elevation.
    a. What is the probable diagnosis?
    b. Which enzyme is elevated first.
    c. When this enzyme will start increase in blood?
    d. What is the normal function of this enzyme?
    e. Name a non-enzyme marker used to diagnose this condition.
6. What is the active form of Thiamine. Describe the deficiency of Thiamine. (1M + 4M)
7. Which is the storage form of vitamin B12? Why there is neurological manifestation and anemia seen in Vitamin B12 deficiency? Write any two functions of Vitamin B12.(1M + 2M + 2M)
8. What is folate trap? Describe the chemistry, assessment of folic acid deficiency? (2M + 1M + 2M)
9. Therapeutic uses of Enzymes
10. A 55 year old chronic smoker and alcoholic suffered from non-specific symptoms like insomnia, dementia, epigastricdiscomfortand recurrent diarrhea. On examination he had disorientation, stomatitis, glossitis and exfloliative dermatitis.
    a. What is the likely diagnosis?
    b. What are the active forms of this vitamin?
    c. Mention the causes leading to deficiency of this vitamin.
    d. Describe the therapeutic role of this vitamin.

III. Multiple choice questions: **1 × 20 = 20 M**

IV.MCQ Date: 21.05.2022 Mark: 1X20=20

1. Enzymes produced in inactive forms
    a) Papain
    b) Lysozymes
    c) Apoenzymes
    d) Proenzymes
2. Enzyme inhibited by feedback inhibition in cholesterol synthesis
    a) HMG CoA lyase
    b) HMG CoA synthatase
    c) None of above
    d) HMG CoA reductase
3. The Michaelis constant (km) indicates
    a) Affinity of enzyme to substrate
    b) Substrate concentration
    c) Enzyme concentration
    d) Inhibitor concentration
4. Lineweaver-Burk plot is
    a) Inverse initial velocity versus inverse of the substrate concentration
    b) Double reciprocal plot
    c) Gives a straight line graph
    d) All of above
5. In competitive inhibition, inhibitor is
    a) Structural analogue
    b) Preventing the real substrate form binding
    c) Inhibition can be reversible
    d) All of above
6. Conversion of Allopurinol to alloxanthine is an example of
    a) Competitive inhibition
    b) Un competitive inhibition
    c) Suicidal inhibition
    d) Non-Competitive inhibition
7. Flipped pattern of LDH isoenzymes is seen in
    a) Myocardial infarction
    b) Peptic ulcer
    c) Liver disease
    d) Infectious diseases
8. Regulation of enzymes by covalent modification involves addition or removal
    a) Acetate
    b) Sulphate
    c) Phosphate
    d) Coenzyme
9. Enzyme elevated in serum reflects cholestasis
    a) Alkaline Phosphatase
    b) 5'-nucleotidase
    c) Γ-Glutamyl transpeptidase
    d) All of above
10. Therapeutic enzymes are
    a) Streptokinase
    b) Hyaluronidase
    c) Serratiopeptidase
    d) All of above
11. Isoprenoid units are found in
    a) Water soluble vitamins
    b) Fat soluble vitamins
    c) Both fat soluble and water soluble vitamins
    d) None

12. Rhodopsin contains
    - **a) Retinal**
    - b) Retinol
    - c) Retinoic acid
    - d) All of above
13. Calcitriol synthesis involves
    - **a) Both liver and kidney**
    - b) Both liver and intestine
    - c) Both liver and adipose tissue
    - d) Both liver and muscle
14. Gamma carboxylation reaction is
    - **a) Vitamin K dependent**
    - b) Vitamin C dependent
    - c) Vitamin D dependent
    - d) All of above
15. Vitamin E reduces the requirement of
    - a) Iron
    - b) Zinc
    - **c) Selenium**
    - d) Magnesium
16. Concentration of pyruvic acid and lactic acid in blood is increased due to
    - **a) Thiamin deficiency**
    - b) Riboflavin deficiency
    - c) Niacin deficiency
    - d) Pantothenic acid deficiency
17. Niacin is synthesized in the body from
    - **a) Tryptophan**
    - b) Tyrosine
    - c) Glutamate
    - d) Aspartate
18. All facts regarding pyridoxal phosphate is correct except
    - a) Deamination
    - b) Decarboxylation
    - **c) Carboxylation**
    - d) Transamination
19. Pyridoxal phosphate is required as a coenzyme in
    - a) Transamination
    - b) Dexarboxylation
    - c) Deamination
    - **d) All of these**
20. Anemia can occur due to the deficiency of all given below except
    - **a) Thiamine**
    - b) Pyridoxine
    - c) Folic acid
    - d) Cyanocobalamin

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DEPARTMENT OF BIOCHEMISTRY,
1st M.B.B.S 2021-2022 Batch
III Internal Assessment - Theory

Portions: Carbohydrate Metabolism, Citric Acid cycle, Biological Oxidation and Electron Transport chain

Date : 18.06.2022 **Time: 1.00 PM-4.00PM**

I Essay: (15X2=30)

1. Define Gluconeogenesis and list out the substrate. Explain the synthesis of glucose from various substrate. Add a note on regulation of gluconeogenesis.
2. An 8 year old girl with enlarged abdomen was irritable, lethargic and was frequently hungry. She often had the symptoms of weakness & sweating which disappeared on eating. Clinical examination the girl was found to have enlarged liver. The laboratory data of the subject are as follows.

Parameter	Subject	Reference range
Blood glucose fasting	40mg/dl	70 100mg/dl
Blood pH	7.25	7.35 – 7.45
Blood ketone bodies	5mg/dl	2 – 3mg/dl
Serum lactate	25mg/dl	3 – 8 mg/dl
Serum Triglycerides	350mg/dl	75 – 150 mg/dl
Serum uric acid	10mg/dl	4– 6mg/dl

1. What is your probable diagnosis? (1)
2. Why hepatomegaly is seen in this patient? (1)
3. What is the genetic basis of this disorder? (1)
4. Explain the biochemical defects seen in this case. (4)
5. Write the reactions and regulation of the carbohydrate pathway involved inthiscase. (4+3)

II. Short Notes: (5X10=50)

1. Glucose transporters
2. Formation and fate of pyruvate
3. Anaplerotic role of citric acid cycle.
4. Inhibitors of ETC
5. Galactosemia
6. Significance of HMP shunt pathway
7. Calculate the energetics of complete oxidation of glucose.
8. Rapoport Luebering shunt

9. Explain the mechanism of ETC with suitable diagram.
10. Lactose Intolerance

III.MCQ **20X1=20**

1. Fluoracetate blocks the krebs cycle by inhibiting the following enzyme
    a) Citrate synthase
    b) Aconitase
    c) α-KG dehydrogenase
    d) succinate dehydrogenase
2. Substrate level phosphorylation in the TCA cycle occurs during the following reaction
    a) Oxidative decarboxylation of isocitrate to α-ketoglutarate
    b) Oxidative decarbozylation of α-KG to succinyl CoA
    c) Formation of succinate from succinyl CoA
    d) Oxidation of succinate to fumarate
3. All the following statements regarding citric acid cycle are true, except
    a) Anaplerotic reactions replenish the intermediates of the TCA cycle which are drawn out of the cycle for other purposes
    b) The availability of ADP is the crucial regulator to TCA cycle
    c) The two carbons released as CO_2 are the same carbon atoms that entered the cycle as acetate units
    d) Three NADH and one $FADH_2$ are formed per cycle of TCA
4. One of the following molecules acts as a mobile electron carrier in respiratory chain
    a) Ubiquinone
    b) $FADH_2$
    c) FeS
    d) Cytochrome b
5. The P:O ratio for the oxidation of NADH
    a) 1
    b) 1.5
    c) 2
    d) 2.5
6. The uncoupling protein thermogenin occurs in
    a) Mitochondria
    b) ER
    c) Nucleus
    d) Golgi complex
7. One of the following is a selenium containing antioxidant enzyme
    a) Catalase
    b) Glutathione peroxidase
    c) Pyruvate dehydrogenase
    d) Alcohol dehydrogenase
8. Glycolysis is the only source of energy for the following organ/tissue
    a) RBC
    b) WBC
    c) Brain
    d) Heart
9. Fluoride inhibits the following enzyme in glycolysis
    a) Aldolase
    b) Enolase
    c) Hexokinase
    d) Phosphofructokinase
10. The net number of ATP synthesized during anerobic glycolysis is
    a) 2
    b) 3
    c) 4
    d) 8
11. Rapaport-Leubering cycle is associated with the synthesis of
    a) 1,3 –bisphosphoglycerate
    b) 2,3-bisphosphoglycerate
    c) Phosphoenol pyruvate
    d) Glyceraldehydes-3-phosphate
12. The reaction mechanism of PDH complex is similar to that of the following enzyme
    a) Malate dehydrogenase
    b) Isocitrate dehydrogenase
    c) Glyceraldehydes-3-phosphate dehydrogenase
    d) α- ketoglutarate dehydrogenase
13. the major chunk of the blood glucose at rest is consumed by
    a) Skeletal Muscle
    b) Liver
    c) Adipose Tissue
    d) Brain
14. cori cycle constitutes
    a) The transport of lactate from the liver to muscle
    b) The transport of alanine from the liver to muscle

c) The transport of propionate to the liver
d) The transport of lactate from muscle to the liver

15. all the following statements about gluconeogenesis are true, except
    a) Except leucine and lysine, all other amino acids take part in gluconeogenesis
    b) The reaction catalysed by pyruvate carboxylase is allosterically activated by acetyl CoA
    c) Acetyl CoA derived from even number fatty acid oxidation is a substrate for gluconeogenesis
    d) Gluconeogenesis is active during starvation because the levels of fructose-2,6-bp are low
16. which one of the following enzymes of glycogen metabolism is dependent on pyridoxal phosphate as coenzyme?
    a) Glycogen synthase
    b) Glucose-1-phosphate uridyl transferase
    c) Glycogen phosphorylase
    d) Debranching enzyme
17. All the following statements regarding glycogen metabolism are true, except
    a) Glucagon an d epinephrine increase glycogen breakdown
    b) Insulin enhances glycogen synthesis
    c) Glucose-1-phosphate allosterically activates glycogen synthase
    d) Ca 2^{+} - calmodulin duo activates phosphorylase kinase independent of hormonal effect
18. Humans cannot synthesise vitamin C due to the deficiency of the following enzyme
    a) UDP- glucose dehydrogenase
    b) Glucuronidase
    c) L-gulonolactone oxidase
    d) Xylitol dehydrogenase
19. Deficiency of the following enzyme causes hereditary fructose intolerance
    a) Aldolase A
    b) Aldolase B
    c) Fructokinase
    d) Glycerol kinase
20. Accumulation of the following metabolite of galactose metabolism is linked with cataract formation
    a) Sorbitol
    b) Lactose
    c) Galactitol
    d) GAGs

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1st M.B.B.S 2021-2022 Batch

IV Internal Assessment - Theory

Portions: Lipid Metabolism

Date : 16.07.2022 **Time: 1.00 PM-3.00PM**

Total Marks: 100

I Essay: **(15X1=15)**

1. Explain the site, steps, energetics of beta oxidation of Palmitic acid. Explain the regulation and disorders of fatty acid oxidation.

II. Short Notes: **(5X5=25)**

11. Name the ketone bodies. How are they formed and utilized in the body?
12. Digestion and absorption of lipids.
13. List the Prostaglandins and their functions.
14. Reverse cholesterol transport.
15. Classification of hyperlipidemias. Write done the investigation and treatment for hyperlipidemias.

III Assignment, SDL and MCQ = 50

IV All Records (practical, academic and assessment) =10

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1st M.B.B.S 2021-2022 Batch

First Central Internal Assessment Exam (IA-5)

Portions: Subcellular Organelles and Cell Membranes, carbohydrate metabolism, TCA cycle, Biological Oxidation and ETC, Heme synthesis and breakdown, Hemoglobin, Clinical Enzymology and Biomarkers, Regulation of Blood Glucose, Insulin and Diabetes mellitus, Vitamins, Nutrition.

Date : 24.08.2022 **Time:9.00 AM – 12.00 NOON**

I Essay: **(15X2=30)**

1. Define and classify Diabetes mellitus. Discuss the factors regulating blood glucose in the fasting and postprandial status. Add a note on the laboratory diagnosis of Diabetes mellitus. (3+8+4)
2. Describe the catabolism and excretion of heme in the body. Explain different types of jaundice with 2 examples for each type. Write a note on Van den Bergh Test and give its significance in each type of jaundice. (6+6+3)

II. Short Notes: **(5X10=50)**

1. Define BMR. Add a note on various factors affecting BMR. (1+4)
2. Write briefly on Glycogen storage disorders. Give its biochemical defects, clinical features and investigations. (2+3)
3. Define and enumerate five iso-enzymes. Write the biomedical importance of any two iso-enzymes.(2+3)
4. Write six Biochemical functions of Pyridoxine. Reason for hematological and neurological manifestations in its deficiency.(3+2)
5. Enumerate biochemical functions of Vitamin A. Write the Wald's Visual cycle. (2+3)
6. Draw and explain the mechanism of ATP synthase complex. List out its inhibitors (4+1)

7. Classify polysaccharides. Write about the site, composition and biological significance for any2 heteroploysaccharide.(1+4)
8. What is Glycated Hemoglobin? Give its normal biological reference range and its clinical significance. (1+1+3)
9. What is Porphyria? Classify different types of porphyria. Give an account of Acute Intermittent Porphyria.
10. Write the significance of Rapaport Leubering shunt.

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1st M.B.B.S 2021-2022 Batch

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1. Which of the following cellular organelle serve as the site of protein synthesis?
    a. Golgi bodies
    b. Endoplasmic reticulum
    c. Mitochondria
    d. Peroxisomes
2. All the following activity are taken place within mitochondria, except:
    a. Citric acid cycle.
    b. ETC.
    c. Beta oxidation
    d. De novo fatty acid synthesis
3. When kidney disease are present, oral doses of vitamin D may not be effective incurring rickets, because:
    a. Hydroxylation reaction is taking place in kidney which activates vitamin.
    b. Dehydrogenation of vitamin D is taking place in kidney.
    c. Hydroxylation of vitamin D is taking place in kidney which destroys vitamin
    d. Vitamin D is stored in liver

4. Vitamin K is inhibited by:
    a. Isoniazid (INH)
    b. Methotrexate
    c. Dicoumarol
    d. Avidin
5. Beriberi is due to the defect of
    a. Niacin
    b. Thiamine
    c. Riboflavin
    d. Vitamin B12
6. Methionine is deficient in
    a. Cereals (rice, wheat)
    b. Maize and corn
    c. Pulses (Bengal gram)
    d. Tapioca (cassava)
7. Calories generated per gram of fat is:
    a. 4 kcal
    b. 5 kcal
    c. 8 kcal
    d. 9 kcal
8. The metal present in vitamin B12 is:
    a. Copper
    b. Cobalt
    c. Chromium
    d. Manganese
9. Estimation of gamma glutamyl transferase is useful to detect one of the following clinical condition:
    a. Alcohol abuse
    b. Infective hepatitis
    c. Kidney failure
    d. Myocardial Infarction
10. All the oxygen handling proteins contain heme as a prosthetic group, except:
    a. Cytochromes.
    b. Peroxidase.
    c. Superoxide dismutase
    d. Tryptophan pyrrolase
11. Rate limiting enzyme in heme synthesis is:
    a. Heme synthase.
    b. ALA dehydrase.
    c. Uroporphyrinogen synthase.
    d. ALA synthase.
12. How many ATPs are generated when one molecule of acetyl CoA is oxidized in TCA cycle?
    a. 2
    b. 8
    c. 10
    d. 15
13. All the following reactions involved in the generation of NADH, except:
    a. Isocitrate to alpha ketoglutarate

b. Alpha ketoglutarate to succinyl CoA
c. Fumarate to malate
d. Malate to oxaloacetate.

14. TCA cycle is regulated by the availability of:
    a. ATP
    b. Glucose
    c. Fatty acid
    d. Succinate dehydrogenase
15. Glucose and galactose are:
    a. Anomers
    b. Constituents of sucrose
    c. Diasterio isomers
    d. Epimers.
16. Which is a nonreducing sugar?
    a. Maltose
    b. Sucrose
    c. Lactose
    d. Isomaltose
17. The heteropolysaccharide which does not contain uronic acid is:
    a. Keratan sulphate.
    b. Dermatan sulphate.
    c. Chondroitin sulphate.
    d. Hyaluronic acid.
18. An example of substrate level phosphorylation is:
    a. Phosphoglycerate kinase.
    b. Enolase.
    c. Pyruvate kinase.
    d. Glyceraldehyde -3-phosphate dehydrogenase.
19. The HMP shunt pathway is important for all the following, except:
    a. Generation of ATP.
    b. Fatty acid biosynthesis.
    c. Synthesis of reduced glutathione
    d. Synthesis of ribose
20. All are true with regards to fructose intolerance, except:
    a. Defective enzyme is aldolase-B
    b. Urine is positive for Rothera's test.
    c. Fructose-1-phosphate accumulates

    d. Glycogen phosphorylase is inhibited.

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1st M.B.B.S 2021-2022 Batch

VI Internal Assessment - Theory

Portions: Molecular Biology

Date : 24.09.2022 Time: 1.00 PM-4.00PM Total Marks: 100

I Essay: (15X4=60)

1. Describe the process of translation. Add a note on post-translation modifications and inhibitors. (8+7)
2. Describe the process of transcription. Add a note on post-transcriptional modifications of mRNA and inhibitors. (8+7)
3. Enumerate the salient features and requirements of replication. Describe the process of replication in eukaryotes. Mention the inhibitors of replication in both prokaryotes and eukaryotes. (3+10+2)
4. What is PCR? Enumerate the types of PCR. Describe the steps of PCR with a neat labeled diagram. What are the important applications of the technique? (1+4+6+4)

II. Draw neat labeled diagrams for the following:(5X4=20)

1. Clover leaf model of t-RNA.
2. Southern Blotting.
3. Steps in recombinant DNA.
4. DNA repair mechanism.

III.MCQ (20X1=20)

1.The separation of parental DNA strands during replication is carried out by
   a. DNA gyrase
   b. DNA helicase
   c. DNA polymerase
   d. All the above

2.Okazaki fragments occur on the
   a. Leading strand
   b. Lagging strand
   c. Double helical parental strand
   d. All the above

3.All the following drugs inhibit replication, except
   a. Ciprofloxacin
   b. 6-mercaptopurine
   c. Nalidixic acid
   d. Allopurinol

4.All the following statements about the DNA damage and repair are correct except
   a. Double-strand breaks can be repaired by homologous recombination
   b. Exposure to UV light produces purine-purine dimmers
   c. Patients suffering from xeroderma pigmentosum are extremely photosensitive
   d. Defects in the genes encoding proteins involved in various repair systems are linked to the development of cancer

5.The flow of biological information ultimately results in the formation of
   a. DNA
   b. RNA
   c. Proteins

d. lipids

6.The transcribable portion of DNA is called

a. Gene
b. TATA box
c. Histones
d. Enhancer sequence

7.One of the following is responsible for the termination of transcription

a. TATA box
b. Sigma factor
c. Rho factor
d. All the above

8.In eukaryotes, mRNA is synthesized by

a. RNAp I
b. RNAP Il
c. RNAp
d. All the above

9.In eukaryotes, the following promoter element determines the starting point of transcription

a. Pribnow box
b. CAAT box
c. Goldberg-Hogness box
d. All the above

10.The primary transcript of mRNA in eukaryotes undergoes the following structural alteration after transcription

a. 5' capping
b. Poly-A tail
c. Splicing
d. All the above

11.All the following statements about the genetic code are correct except

a. The codon is unambiguous
b. The codon is universal
c. The codon is degenerate
d. The codons overlap during translation

12.The enzyme catalysing the peptide bond formation during translation is

a. Aminoacyl-tRNA synthetase
b. Protease
c. Peptidyl transferase
d. Translocase

13.Hydroxylation of proline and lysine in collagen molecule requires the following vitamin

a. Vitamin D
b. Vitamin E
c. Vitamin C
d. Vitamin K

14.Which one of the following post-translational modifications requiresvitamin K?

a. Methylation of calmodulin
b. ADP-ribosylation of histone proteins
c. Hydroxylation of proline and lysine in collagen
d. Carboxylation of glutamate in prothrombin

15.The key process underlying the synthesis of a large number of distinct antibodies is called
   a. Gene amplification
   b. Gene rearrangement
   c. Alternate mRNA splicing
   d. Gene regulation at the level of translation
16.Reverse transcriptase catalyses:
   a. Synthesis of RNA from DNA
   b. Breakdown of RNA
   c. Synthesis of DNA from RNA
   d. Breakdown of DNA
17.Frameshift mutation results from:
   a. Substitution of a single base
   b. Deletion of a single base
   c. Addition of codon
   d. Deletion of a codon
18.A child presents with hyperuricemia and delayed developmental milestones. He also has the habit of biting fingers and nails. what is the most probable enzyme deficiency?
   a. HGPRTase deficiency
   b. Phenylalanine hydroxylase
   c. Adenine deaminase
   d. Hexosaminidase A
19.The first protein synthesized by recombinant DNA technology was:
   a. Streptokinase
   b. Human growth hormone
   c. Tissue plasminogen activator
   d. Human insulin
20 DNA finger printing is based on unique:
   a. Coding sequences
   b. Tandem repeats
   c. Mutant genes
   d. Duplication of genes

VELAMMAL MEDICAL COLLEGE HOSPITAL & RESEARCH INSTITUTE
AFFILIATED TO THE TAMILNADU Dr M.G.R. MEDICAL UNIVERSITY
DEPARTMENT OF BIOCHEMISTRY

1st M.B.B.S 2021-2022 Batch

VII Internal Assessment Exam

Portions: Protein Metabolism

Date : 22.10.2022 **Time: 1.00 – 4.00 PM**

I Essay: **(15X3=45)**

1. A mother of a 10 month old infant came to paediatric OPD and showed diaper of her baby having blackish discoloration. Milestones were appropriate for age. No developmental delay was observed. Urine tests showed positive Benedict's test. Ferric chloride test-green in colour.
   a. What is the probable diagnosis? (1M)
   b. Which amino acid metabolism is affected and give the enzyme defect? (2M)
   c. Explain the probable reason for blackish discoloration in diaper of infant. (1M)
   d. Describe the metabolic pathway of affected the amino acid? (8M)
   e. Describe the steps by which catecholamines are synthesized in our body. (3M)
2. What is transamination. Give its metabolic importance with suitable example. Describe urea cycle under following subheadings – site, steps, regulation, primary and secondary defects. (1M+ 4M+ 10M)
3. Describe metabolism of methionine. Explain the term transmethylation with suitable example. Give the enzyme defect, clinical feature, investigation and treatment of Homocystinuria. (6M + 4M+ 5M)

II. Short Notes: **(5X5=25)**

11. MSUD
12. Special products formed from Glycine.
13. Synthesis and functions of Polyamines.
14. Meister cycle.
15. Synthesis and biochemical functions of Nitric oxide.

III. Multiple choice Questions: **(1X 30 = 30)**

Assignment:

<table>
<tr><th>Assignment Dates</th><th>Assignment Topics</th></tr>
<tr><td>09.04.2022</td><td>
<u>AssignmentNumber-1:</u>
Chemistry of carbohydrates
1. What is a monosaccharide and Disaccharide? Give example
2. What is homopolysaccharide? Give two examples.
3. What is epimerism and mutarotation. Give examples.
4. What is a glycoside? Give examples.
5. Sucrose is a non-reducing sugar, why?
6. Enumerate the functions of GAG.
7. What is the sugar found in milk? Give its glycosidic linkage.
8. Match the following
<table>
<tr><td>1.Glucose and galactose</td><td>Epimerism</td></tr>
<tr><td>2.Glucose and Fructose</td><td>Functional isomerism</td></tr>
<tr><td>3.L&D forms</td><td>Penultimate carbon atom</td></tr>
<tr><td>4. α and β</td><td>Anomers</td></tr>
<tr><td>5. + and -</td><td>Optical isomerism</td></tr>
<tr><td>6.Hyaluronic acid</td><td>Cartilage</td></tr>
<tr><td>7.Keratan sulphate</td><td>Aortic wall</td></tr>
<tr><td>8.Dermatan sulphate</td><td>Vitreous</td></tr>
<tr><td>9.Heparan sulphate</td><td>Widest distribution</td></tr>
<tr><td>10.Chondroitin sulphate</td><td>Loose connective tissue</td></tr>
</table>
</td></tr>
</table>

5 Marks:

1. Define a Carbohydrate. Classify and give examples.Write their biological significance.
2. Write the classifications of carbohydrates giving examples and their biochemical functions in human body.
3. What are the various mucopolysaccharides? Add a note on hyaluronic acid.
4. Define and enumerate the types of heteropolysaccharides. Write their chemical composition and major properties. Give their location and biological functions.
5. What is GAG? Difference between GAG and glycoprotein. Give their important functions.

30.04.2022

<u>Assignment Number-2:</u>

Chemistry of lipids & Fat-soluble vitamins

I LAQ 15 marks:

1. Describe the chemistry , absorption, biochemical functions and deficiency manifestations of Vitamin A. Add a note on toxicity of vitamin A.
2. Define and classify phospholipids. Write in detail about the structure and function of Phospholipids.
3. A 5 year boy presented to the paediatric clinic with complaints of slow growth and pain in bones. On examination he was anaemic with bowing of legs. Laboratory results were as follows:
    - Serum Calcium: 8.2 mg/dL
    - Serum Phosphorus: 2.8 mg/dL
    - Serum ALP: 720 U/L
        i. What is the probable diagnosis? (1mark)

<table>
<tr><td></td><td>ii. Explain the clinical manifestations and lab investigations (4 marks)
iii. Describe the sources, metabolism, biochemical functions, RDA and other deficiency manifestations of the deficient vitamin.(10 marks)</td></tr>
<tr><td>30.05.2022</td><td><u>Assignment Number-3:</u>

<table><tr><th>Batch</th><th>TOPIC</th></tr><tr><td>A</td><td>Collagen: types, structure and function</td></tr><tr><td>B</td><td>Vitamin tabulation</td></tr><tr><td>C</td><td>Enzymes used as therapeutic agents and for diagnostic purpose</td></tr></table></td></tr>
<tr><td>04.07.2022</td><td><u>Assignment Number: 4</u>
<u>15 Marks:</u>
Describe the metabolism of endogenously produced TAG and cholesterol from liver to peripheral tissue. List the disorder related to this lipoprotein metabolism.
Describe the structure and function of various lipoproteins. Explain the reverse cholesterol transport and its clinical significance.
<u>5 Marks:</u>
Digestion and absorption of lipids.
Ketosis.
Disorders of Fatty acid oxidation.
Fatty acid synthase complex.
Fate of cholesterol.</td></tr>
<tr><td>11.07.2022</td><td><u>Assignment Number: 5</u>
1. Hyperlipoproteinemia. Investigation and treatment of Hyperlipoproteinemia.
2. Lipid profile.</td></tr>
</table>

	3. Investigation and treatment of Hyperlipoproteinemia. 4. Fatty liver and Lipotropic Factors. 5. Sphingolipidoses – (Types, enzyme defect, products accumulated and symptoms) 6. Lipoprotein (a) 7. Bile salts – Synthesis & biological role. 8. Sources & fate of acetyl CoA 9. Structure of cholesterol and its importance in the body. 10. Fredrickson's classification of hyperlipoproteinemias.
05.08.2022	<u>Assignment Number: 6</u> 1) Describe the biosynthesis of heme. Add a note on regulation of heme synthesis. 2) What is Porphyria? Explain types, enzyme defects, inheritance and salient features. 3) Define BMR. Explain the factors affecting BMR.
05.09.2022	<u>Assignment Number: 7</u> 1. Structure of DNA 2. Replication 3. rDNA Technology
12.09.2022	<u>Assignment Number: 8</u> 1. Describe the process of Translation. Add a note on post-translational modifications & inhibitors 2. Describe the process of Transcription. Add a note on post-transcriptional modifications & inhibitors
19.09.2022	<u>Assignment Number: 9</u> Draw neat labeled diagram for the following: 1. Watson Crick Model 2. Clover leaf model of tRNA

	3. Southern Blotting 4. RFLP 5. Steps in rDNA technology 6. DNA Repair mechanisms 7. PCR 8. Replication 9. Translation 10. Splicing
06.10.2022	<u>Assignment Number: 10</u> 1. Iron Metabolism 2. Calcium & Phosphorus Metabolism
17.10.2022	<u>Assignment Number: 11</u> I. Essay: (LAQ) 1. What is Transdeamination? Give its metabolic importance with suitable examples. Describe the site, steps, energetic and regulation of urea cycle. Enumerate the causes of hyperammonemia, uremia and its clinical features. Give the reason for its neuronal toxicity. 2. A male child was brought to the casualty following an attack of generalized convulsions. Child was found to have delayed milestones and mental retardation. On examination, hypopigmentation of skin associated with eczema, mousy odour of body and urine was observed. Child was dull and had a blank look. a. Suggest your probable diagnosis b. Why there is mental retardation and hypopigmentation seen in this patient? c. Name the enzyme defect, clinical manifestation, investigations and treatment of the above disorder.

	d. Describe the steps in phenylalanine metabolism. II. Write notes on: (SAQ) 1. Tryptophan metabolism 2. Alkaptanuria 3. Hartnup's disease 4. Meister's cycle

VELAMMAL MEDICAL COLLEGE
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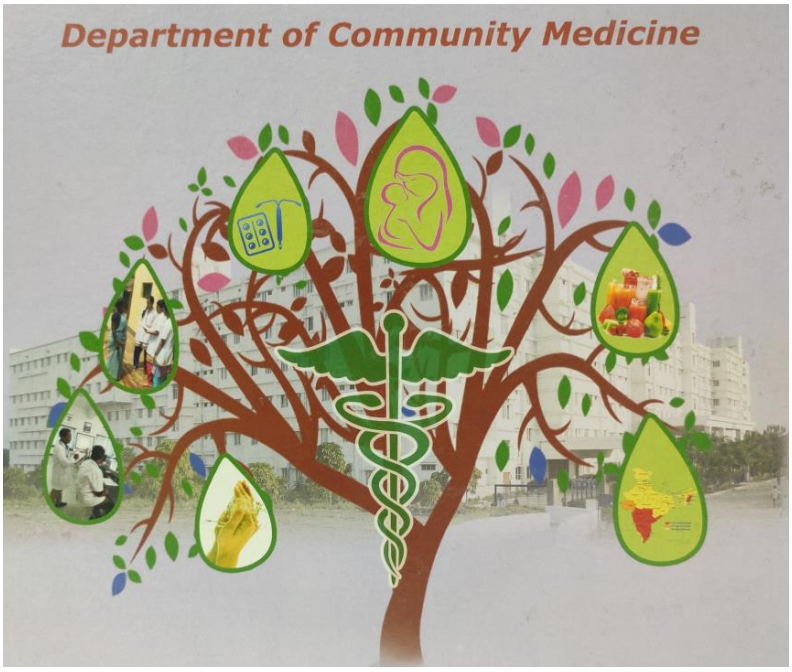
Course File

THIRD MBBS – 2021-2022

Department of community medicine



Velammal Medical College Hospital and Research Institute

Anupanadi – Madurai-09

COURSE FILE

Department : Department of community Medicine

Year to whom subject is offered : Third Year MBBS

Name of the Subject : Community Medicine

Faculty names

Dr.Samir Bele	Professor and HOD
Dr.Trupti Bodhare	Professor
Dr.Sudhir	Associate professor
Dr.Munish	Assistant professor
Dr.Sudharsan	Assistant professor
Dr.Sriandaal	Assistant professor
Dr.Vasumathi	Assistant professor
Mr.Vijay Anto	Statistician

Velammal Medical College Hospital and Research Institute

Anupanadi – Madurai-09

Department Of Community Medicine

Name of the Subject :Community Medicine

Program : Undergraduate

Year :Third year MBBS

Prepared by

Name: Dr. Trupti

Sign:

Design: Professor

Date:

Approved by

Name: Dr. Samir Bele

Sign:

Date:

For QC only

Name:

Sign:

Design:

Date:

Index

VISION AND MISSION OF THE INSTITUTION

VISION AND MISSION OF THE INSTITUTE

Vision

To build the healthy society with dedicated, well qualified and experienced doctors and supporting staffs by easily offering to people the world-class health care services at an affordable cost.

Mission

Our mission is to provide health care services at an affordable cost. We are committed to continuously improving our quality and maintaining high standards of patients care with excellence, competence, and compassion by following the best practises in the health care industry.

VISION AND MISSION OF THE DEPARTMENT

VISION AND MISSION OF THE DEPARTMENT

Vision

The goal of the department is to produce skilled, knowledgeable, and empathetic doctors, capable of providing need-based services to the community

Mission

Department of Community Medicine is primarily vested with the responsibility of imparting community-based education, which is essential to acquire skills for providing primary health care. The domain of the subject is extensive, ranging from the promotion of health and prevention of diseases to the implementation of policies and programmes using socially oriented strategies. He/she should be a good clinician, capable of providing comprehensive care, a good researcher, an excellent communicator, and a lifelong learner who is ethically responsive to the community. Students should be able to identify the socioeconomic inequalities as determinants of health and suggest interventions based on moral values at individual, family, and community level.

COURSE OBJECTIVES AND COURSE OUTCOMES

Course objective and course outcomes

Course objectives:

At the end of the course, the student should be able to:

1. Understand the concepts of health and disease describe the levels of prevention and modes of intervention.

2. Describe the epidemiological methods and apply appropriate epidemiological methods to study and manage communicable and non-communicable diseases in the hospital and community situations.

3. Define vital statistics and describe the various methods that are used to collect data, apply bio-statistical methods and techniques to make inferences and describe the health information systems.

4. Outline the demographic pattern of the country and appreciate the roles of the individual, family, community and socio-cultural milieu in health and disease.

5. Diagnose and manage maternal and child health problems and advise couples and the community on the family planning methods available.

6. Describe the methods of nutritional assessment to diagnose and manage common nutritional problems at the individual and community levels.

7. Enunciate the principles and elements of primary health care, describe the organization and functions of the health care team at Primary Health Centre, Community Health Centre and District levels.

8. Describe and evaluate the various National Health Programmes with particular emphasis on maternal and child health programmes, family welfare and population control, communicable and non-communicable disease prevention, and its implementation in the community.

9. Describe the importance of water and sanitation in human health; identify and investigate the environmental and occupational hazards, disaster, disease outbreak and apply management techniques for their control.

10. Describe the principles and practice of health education and to apply appropriate communication skills to bring about behavioural change in the community.

11. Capacity to plan and implement the measures for disaster.

Course outcomes:

At the end of the course the student should be able to acquire the following competencies under the three domains, Cognitive, Affective and Psychomotor

Affective domain (Attitude)

CO1. The goal is to prepare students to function as proficient Community Physician in contemporary health needs and accountable to community.

Cognitive domain (Knowledge)

The student should be able to:

CO2. Describe the health care delivery system including rehabilitation of the disabled in the community

CO3. Describe the National Health Programmes with particular emphasis on maternal and child health programmes, family welfare planning and population control.

C04. List epidemiological methods and describe their application to communicable and noncommunicable diseases in the community or hospital situation.

C05. Apply biostatistical methods and techniques

CO6. Outline the demographic pattern of the country and appreciate the roles of the individual, family, community and socio-cultural milieu in health and disease.

CO7. Describe the health information systems.

CO8. Enunciate the principles and components of primary health care and the national health policies to achieve the goal of 'Health for All'.

CO9. Plan Health Education Programme/IEC activities & able to evaluate a programme.

CO10. Identify the environmental and occupational hazards and their control.

CO11. Health education in relation to community.

Psychomotor domain (Skills)

The student should be able to:

CO12. Use epidemiology as a scientific tool to make rational decisions relevant to community and individual patient intervention.

CO13. Collect, analyse, interpret, and present simple community and hospital-based data.

CO14. Diagnose and manage common health problems and emergencies at the individual, family and community levels keeping in mind the existing health care resources and in the context of the prevailing socio-cultural beliefs.

CO15. Diagnose and manage maternal and child health problems and advise a couple and the community on the family planning methods available in the context of the national priorities.

CO16. Diagnose and manage common nutritional problems at the individual and community level.

CO17. Plan, implement and evaluate a health education programme with the skill to use simple audio-visual aids.

SYLLABUS

Number	COMPETENCY The student should be able to	Domain K/S/A/C	Level K/KH/ SH/P	Core Y/N	Suggested Teaching learning method	Suggested Assessment method	Number required to certify P	Vertical Integration	Horizontal Integration
Topic: Concept of Health and Disease		**Number of competencies: (10)**			**Number of procedures that require certification:(NIL)**				
CM1.1	Define and describe the concept of Public Health	K	KH	Y	Lecture, Small group discussion	Written / Viva voce			
CM1.2	Define health; describe the concept of holistic health including concept of spiritual health and the relativeness & determinants of health	K	KH	Y	Lecture, Small group discussion	Written / Viva voce			
CM1.3	Describe the characteristics of agent, host and environmental factors in health and disease and the multi factorial etiology of disease	K	KH	Y	Lecture, Small group discussion	Written / Viva voce			
CM1.4	Describe and discuss the natural history of disease	K	KH	Y	Lecture, Small group discussion	Written / Viva voce			
CM1.5	Describe the application of interventions at various levels of prevention	K	KH	Y	Lecture, Small group discussion	Written / Viva voce			
CM1.6	Describe and discuss the concepts, the principles of Health promotion and Education, IEC and Behavioral change communication (BCC)	K	KH	Y	Lecture, Small group discussion	Written / Viva voce			
CM1.7	Enumerate and describe health indicators	K	KH	Y	Lecture, Small group discussion	Written / Viva voce			
CM1.8	Describe the Demographic profile of India and discuss its impact on health	K	KH	Y	Lecture, Small group discussion	Written / Viva voce			
CM1.9	Demonstrate the role of effective Communication skills in health in a simulated environment	S	SH	Y	DOAP sessions	Skill Assessment		AETCOM	
CM1.10	Demonstrate the important aspects of the doctor patient relationship in a simulated environment	S	SH	Y	DOAP sessions	Skill Assessment		AETCOM	

Number	COMPETENCY The student should be able to	Domain K/S/A/C	Level K/KH/ SH/P	Core Y/N	Suggested Teaching learning method	Suggested Assessment method	Number required to certify P	Vertical Integration	Horizontal Integration
Topic: Relationship of social and behavioural to health and disease		**Number of competencies: (5)**			**Number of procedures that require certification: (NIL)**				
CM2.1	Describe the steps and perform clinico socio-cultural and demographic assessment of the individual, family and community	S	SH	Y	Lecture, Small group discussion, DOAP session	Written / Viva voce/ Skill assessment			
CM2.2	Describe the socio-cultural factors, family (types), its role in health and disease & demonstrate in a simulated environment the correct assessment of socio-economic status	S	SH	Y	Lecture, Small group discussion, DOAP session	Written / Viva voce/ Skill assessment			
CM2.3	Describe and demonstrate in a simulated environment the assessment of barriers to good health and health seeking behavior	S	SH	Y	Lecture, Small group discussion, DOAP session	Written / Viva voce/ Skill assessment			
CM2.4	Describe social psychology, community behaviour and community relationship and their impact on health and disease	K	KH	Y	Lecture, Small group discussion	Written / Viva voce			
CM2.5	Describe poverty and social security measures and its relationship to health and disease	K	KH	Y	Lecture, Small group discussion	Written / Viva voce			
Topic: Environmental Health Problems		**Number of competencies: (8)**			**Number of procedures that require certification: (NIL)**				
CM3.1	Describe the health hazards of air, water, noise, radiation and pollution	K	KH	Y	Lecture, Small group discussion	Written / Viva voce		General Medicine, ENT	
CM3.2	Describe concepts of safe and wholesome water, sanitary sources of water, water purification processes, water quality standards, concepts of water conservation and rainwater harvesting	K	KH	Y	Lecture, Small group discussion, DOAP session	Written / Viva voce			
CM3.3	Describe the aetiology and basis of water borne diseases /jaundice/hepatitis/ diarrheal diseases	K	KH	Y	Lecture, Small group discussion, DOAP session	Written / Viva voce		Microbiology, General Medicine, Pediatrics	
CM3.4	Describe the concept of solid waste, human excreta and sewage disposal	K	KH	Y	Lecture, Small group discussion	Written / Viva voce			

Number	COMPETENCY The student should be able to	Domain K/S/A/C	Level K/KH/ SH/P	Core Y/N	Suggested Teaching learning method	Suggested Assessment method	Number required to certify P	Vertical Integration	Horizontal Integration
CM3.5	Describe the standards of housing and the effect of housing on health	K	KH	Y	Lecture, Small group discussion	Written / Viva voce			
CM3.6	Describe the role of vectors in the causation of diseases. Also discuss National Vector Borne disease Control Program	K	KH	Y	Lecture, Small group discussion	Written / Viva voce		Microbiology	
CM3.7	Identify and describe the identifying features and life cycles of vectors of Public Health importance and their control measures	S	SH	Y	Lecture, Small group discussion, DOAP session	Written / Viva voce/ Skill assessment		Microbiology	
CM3.8	Describe the mode of action, application cycle of commonly used insecticides and rodenticides	K	KH	Y	Lecture, Small group discussion	Written / Viva voce		Pharmacology	
Topic: Principles of health promotion and education **Number of competencies: (3)** **Number of procedures that require certification: (NIL)**									
CM4.1	Describe various methods of health education with their advantages and limitations	K	KH	Y	Lecture, Small group discussion	Written / Viva voce			
CM4.2	Describe the methods of organizing health promotion and education and counselling activities at individual family and community settings	K	KH	Y	Lecture, Small group discussion	Written / Viva voce			
CM4.3	Demonstrate and describe the steps in evaluation of health promotion and education program	S	SH	Y	Small group session, DOAP session	Written / Viva voce/ Skill assessment			
Topic: Nutrition **Number of competencies: (08)** **Number of procedures that require certification: (NIL)**									
CM5.1	Describe the common sources of various nutrients and special nutritional requirements according to age, sex, activity, physiological conditions	K	KH	Y	Lecture, Small group discussion	Written / Viva voce		General Medicine, Pediatrics	
CM5.2	Describe and demonstrate the correct method of performing a nutritional assessment of individuals, families and the community by using the appropriate method	S	SH	Y	DOAP sessions	Skill Assessment		General Medicine, Pediatrics	

Number	COMPETENCY The student should be able to	Domain K/S/A/C	Level K/KH/ SH/P	Core Y/N	Suggested Teaching learning method	Suggested Assessment method	Number required to certify P	Vertical Integration	Horizontal Integration
CM5.3	Define and describe common nutrition related health disorders (including macro-PEM, Micro-iron, Zn, iodine, Vit. A), their control and management	K	KH	Y	Lecture, Small group discussion	Written / Viva voce		General Medicine, Pediatrics	
CM5.4	Plan and recommend a suitable diet for the individuals and families based on local availability of foods and economic status, etc in a simulated environment	S	SH	Y	DOAP sessions	Skill Assessment		General Medicine, Pediatrics	
CM5.5	Describe the methods of nutritional surveillance, principles of nutritional education and rehabilitation in the context of socio- cultural factors.	K	KH	Y	Lecture, Small group discussion	Written / Viva voce		General Medicine, Pediatrics	
CM5.6	Enumerate and discuss the National Nutrition Policy, important national nutritional Programs including the Integrated Child Development Services Scheme (ICDS) etc	K	KH	Y	Lecture, Small group discussion	Written / Viva voce		Pediatrics	
CM5.7	Describe food hygiene	K	KH	Y	Lecture, Small group discussion	Written / Viva voce			Microbiology
CM5.8	Describe and discuss the importance and methods of food fortification and effects of additives and adulteration	K	KH	Y	Lecture, Small group discussion	Written / Viva voce		Pediatrics	
Topic: Basic statistics and its applications		**Number of competencies: (04)**			**Number of procedures that require certification: (NIL)**				
CM6.1	Formulate a research question for a study	K	KH	Y	Small group discussion, Lecture, DOAP sessions	Written / Viva voce/ Skill assessment		General Medicine, Pediatrics	
CM6.2	Describe and discuss the principles and demonstrate the methods of collection, classification, analysis, interpretation and presentation of statistical data	S	SH	Y	Small group, Lecture, DOAP sessions	Written / Viva voce/ Skill assessment		General Medicine, Pediatrics	
CM6.3	Describe, discuss and demonstrate the application of elementary statistical methods including test of significance in various study designs	S	SH	Y	Small group discussion, Lecture, DOAP sessions	Written / Viva voce/ Skill assessment		General Medicine, Pediatrics	

Number	COMPETENCY The student should be able to	Domain K/S/A/C	Level K/KH/ SH/P	Core Y/N	Suggested Teaching learning method	Suggested Assessment method	Number required to certify P	Vertical Integration	Horizontal Integration
CM6.4	Enumerate, discuss and demonstrate Common sampling techniques, simple statistical methods, frequency distribution, measures of central tendency and dispersion	S	SH	Y	Small group discussion, Lecture, DOAP sessions	Written / Viva voce/ Skill assessment		General Medicine, Pediatrics	
Topic: Epidemiology		**Number of competencies: (09)**			**Number of procedures that require certification: (NIL)**				
CM7.1	Define Epidemiology and describe and enumerate the principles, concepts and uses	K	KH	Y	Small group discussion, Lecture	Written / Viva voce		General Medicine	
CM7.2	Enumerate, describe and discuss the modes of transmission and measures for prevention and control of communicable and non-communicable diseases	K	KH	Y	Small group discussion, Lecture	Written / Viva voce		General Medicine	
CM7.3	Enumerate, describe and discuss the sources of epidemiological data	K	KH	Y	Small group discussion, Lecture	Written / Viva voce		General Medicine	
CM7.4	Define, calculate and interpret morbidity and mortality indicators based on given set of data	S	SH	Y	Small group, DOAP sessions	Written/ Skill assessment		General Medicine	
CM7.5	Enumerate, define, describe and discuss epidemiological study designs	K	KH	Y	Small group discussion, Lecture	Written / Viva voce		General Medicine	
CM7.6	Enumerate and evaluate the need of screening tests	S	SH	Y	Small group discussion, DOAP sessions	Written/ Skill assessment		General Medicine	
CM7.7	Describe and demonstrate the steps in the Investigation of an epidemic of communicable disease and describe the principles of control measures	S	SH	Y	Small group discussion, DOAP sessions	Written/ Skill assessment		General Medicine	Microbiology
CM7.8	Describe the principles of association, causation and biases in epidemiological studies	K	KH	Y	Small group discussion, Lecture	Written / Viva voce		General Medicine	
CM7.9	Describe and demonstrate the application of computers in epidemiology	S	KH	Y	Small group discussion, DOAP sessions	Written			

Number	COMPETENCY The student should be able to	Domain K/S/A/C	Level K/KH/ SH/P	Core Y/N	Suggested Teaching learning method	Suggested Assessment method	Number required to certify P	Vertical Integration	Horizontal Integration
Topic: Epidemiology of communicable and non- communicable diseases		**Number of competencies:(7)**				**Number of procedures that require certification:(NIL)**			
CM8.1	Describe and discuss the epidemiological and control measures including the use of essential laboratory tests at the primary care level for communicable diseases	K	KH	Y	Small group discussion, Lecture	Written / Viva voce		General Medicine, Pediatrics	Microbiology, Pathology
CM8.2	Describe and discuss the epidemiological and control measures including the use of essential laboratory tests at the primary care level for Non Communicable diseases (diabetes, Hypertension, Stroke, obesity and cancer etc.)	K	KH	Y	Small group discussion, Lecture	Written / Viva voce		General Medicine	
CM8.3	Enumerate and describe disease specific National Health Programs including their prevention and treatment of a case	K	KH	Y	Small group discussion, Lecture	Written / Viva voce		General Medicine, Pediatrics	
CM8.4	Describe the principles and enumerate the measures to control a disease epidemic	K	KH	Y	Small group discussion, Lecture	Written / Viva voce		General Medicine, Pediatrics	
CM8.5	Describe and discuss the principles of planning, implementing and evaluating control measures for disease at community level bearing in mind the public health importance of the disease	K	KH	Y	Small group discussion, Lecture	Written / Viva voce		General Medicine, Pediatrics	
CM8.6	Educate and train health workers in disease surveillance, control & treatment and health education	S	SH	Y	DOAP sessions	Skill assessment			
CM8.7	Describe the principles of management of information systems	K	KH	Y	Small group discussion, Lecture	Written / Viva voce			
Topic: Demography and vital statistics		**Number of competencies: (07)**				**Number of procedures that require certification: (NIL)**			
CM9.1	Define and describe the principles of Demography, Demographic cycle, Vital statistics	K	KH	Y	Small group discussion, Lecture	Written / Viva voce			
CM9.2	Define, calculate and interpret demographic indices including birth rate, death rate, fertility rates	S	SH	Y	Lecture, Small group discussion, DOAP sessions	Skill assessment		Obstetrics & Gynaecology, Pediatrics	

Number	COMPETENCY The student should be able to	Domain K/S/A/C	Level K/KH/ SH/P	Core Y/N	Suggested Teaching learning method	Suggested Assessment method	Number required to certify P	Vertical Integration	Horizontal Integration
CM9.3	Enumerate and describe the causes of declining sex ratio and its social and health implications	K	KH	Y	Small group discussion, Lecture	Written / Viva voce			
CM9.4	Enumerate and describe the causes and consequences of population explosion and population dynamics of India.	K	KH	Y	Small group discussion, Lecture	Written / Viva voce			
CM9.5	Describe the methods of population control	K	KH	Y	Small group discussion, Lecture	Written / Viva voce		Obstetrics & Gynaecology	
CM9.6	Describe the National Population Policy	K	KH	Y	Small group discussion, Lecture	Written / Viva voce			
CM9.7	Enumerate the sources of vital statistics including census, SRS, NFHS, NSSO etc	K	KH	Y	Small group discussion, Lecture	Written / Viva voce			
Topic: Reproductive maternal and child health		**Number of competensies:(09)**				**Number of procedures that require certification: (NIL)**			
CM10.1	Describe the current status of Reproductive, maternal, newborn and Child Health	K	KH	Y	Small group discussion, Lecture	Written / Viva voce		Obstetrics & Gynaecology, Pediatrics	
CM10.2	Enumerate and describe the methods of screening high risk groups and common health problems	K	KH	Y	Small group discussion, Lecture	Written / Viva voce		Pediatrics, Obstetrics & Gynaecology	
CM10.3	Describe local customs and practices during pregnancy, childbirth, lactation and child feeding practices	K	KH	Y	Small group discussion, Lecture	Written / Viva voce		Pediatrics, Obstetrics & Gynaecology	
CM10.4	Describe the reproductive, maternal, newborn & child health (RMCH); child survival and safe motherhood interventions	K	KH	Y	Small group discussion, Lecture	Written / Viva voce		Obstetrics & Gynaecology, Pediatrics	
CM10.5	Describe Universal Immunization Program; Integrated Management of Neonatal and Childhood Illness (IMNCI) and other existing Programs.	K	KH	Y	Small group discussion, Lecture	Written / Viva voce		Pediatrics	
CM10.6	Enumerate and describe various family planning methods, their advantages and shortcomings	K	KH	Y	Small group discussion, Lecture	Written / Viva voce			

Number	COMPETENCY The student should be able to	Domain K/S/A/C	Level K/KH/ SH/P	Core Y/N	Suggested Teaching learning method	Suggested Assessment method	Number required to certify P	Vertical Integration	Horizontal Integration
CM10.7	Enumerate and describe the basis and principles of the Family Welfare Program including the organization, technical and operational aspects	K	KH	Y	Small group discussion, Lecture	Written / Viva voce			
CM10.8	Describe the physiology, clinical management and principles of adolescent health including ARSH	K	KH	Y	Small group discussion, Lecture	Written / Viva voce			
CM10.9	Describe and discuss gender issues and women empowerment	K	KH	Y	Small group discussion, Lecture	Written / Viva voce			
Topic: Occupational Health		**Number of competencies: (05)**				**Number of procedures that require certification: (NIL)**			
CM11.1	Enumerate and describe the presenting features of patients with occupational illness including agriculture	K	KH	Y	Small group discussion, Lecture	Written / Viva voce			
CM11.2	Describe the role, benefits and functioning of the employees state insurance scheme	K	KH	Y	Small group discussion, Lecture	Written / Viva voce			
CM11.3	Enumerate and describe specific occupational health hazards, their risk factors and preventive measures	K	KH	Y	Small group discussion, Lecture	Written / Viva voce			
CM11.4	Describe the principles of ergonomics in health preservation	K	KH	Y	Small group discussion, Lecture	Written / Viva voce			
CM11.5	Describe occupational disorders of health professionals and their prevention & management	K	KH	Y	Small group discussion, Lecture	Written / Viva voce			
Topic: Geriatric services		**Number of competencies: (04)**				**Number of procedures that require certification: (NIL)**			
CM12.1	Define and describe the concept of Geriatric services	K	KH	Y	Lecture, Small group discussion	Written / Viva voce		General Medicine	
CM12.2	Describe health problems of aged population	K	KH	Y	Lecture, Small group discussion	Written / Viva voce		General Medicine	
CM12.3	Describe the prevention of health problems of aged population	K	KH	Y	Lecture, Small group discussion	Written / Viva voce		General Medicine	

Number	COMPETENCY The student should be able to	Domain K/S/A/C	Level K/KH/ SH/P	Core Y/N	Suggested Teaching learning method	Suggested Assessment method	Number required to certify P	Vertical Integration	Horizontal Integration
CM12.4	Describe National program for elderly	K	KH	Y	Lecture, Small group discussion	Written / Viva voce		General Medicine	
Topic: Disaster Management		**Number of competencies: (04)**				**Number of procedures that require certification: (NIL)**			
CM13.1	Define and describe the concept of Disaster management	K	KH	Y	Lecture, Small group discussion	Written / Viva voce		General Surgery, General Medicine	
CM13.2	Describe disaster management cycle	K	KH	Y	Lecture, Small group discussion	Written / Viva voce		General Surgery, General Medicine	
CM13.3	Describe man made disasters in the world and in India	K	KH	Y	Lecture, Small group discussion	Written / Viva voce		General Surgery, General Medicine	
CM13.4	Describe the details of the National Disaster management Authority	K	KH	Y	Lecture, Small group discussion	Written / Viva voce		General Surgery, General Medicine	
Topic: Hospital waste management		**Number of competencies: (03)**				**Number of procedures that require certification: (NIL)**			
CM14.1	Define and classify hospital waste	K	KH	Y	Lecture, Small group discussion, visit to hospital	Written / Viva voce			Microbiology
CM14.2	Describe various methods of treatment of hospital waste	K	KH	Y	Lecture, Small group discussion, visit to hospital	Written / Viva voce			Microbiology
CM14.3	Describe laws related to hospital waste management	K	KH	Y	Lecture, Small group discussion	Written / Viva voce			Microbiology
Topic: Mental Health		**Number of competencies: (03)**				**Number of procedures that require certification: (NIL)**			
CM15.1	Define and describe the concept of mental Health	K	KH	Y	Lecture, Small group discussion	Written / Viva voce		Psychiatry	
CM15.2	Describe warning signals of mental health disorder	K	KH	Y	Lecture, Small group discussion	Written / Viva voce		Psychiatry	
CM15.3	Describe National Mental Health program	K	KH	Y	Lecture, Small group discussion	Written / Viva voce		Psychiatry	

Number	COMPETENCY The student should be able to	Domain K/S/A/C	Level K/KH/ SH/P	Core Y/N	Suggested Teaching learning method	Suggested Assessment method	Number required to certify P	Vertical Integration	Horizontal Integration
Topic: Health planning and management		**Number of competencies: (04)**			**Number of procedures that require certification: (NIL)**				
CM16.1	Define and describe the concept of Health planning	K	KH	Y	Lecture, Small group discussion	Written / Viva voce			
CM16.2	Describe planning cycle	K	KH	Y	Lecture, Small group discussion	Written / Viva voce			
CM16.3	Describe Health management techniques	K	KH	Y	Lecture, Small group discussion	Written / Viva voce			
CM16.4	Describe health planning in India and National policies related to health and health planning	K	KH	Y	Lecture, Small group discussion	Written / Viva voce			
Topic: Health care of the communtiy		**Number of competencies:(05)**			**Number of procedures that require certification: (NIL)**				
CM17.1	Define and describe the concept of health care to community	K	KH	Y	Lecture, Small group discussion	Written / Viva voce			
CM17.2	Describe community diagnosis	K	KH	Y	Lecture, Small group discussion	Written / Viva voce			
CM17.3	Describe primary health care, its components and principles	K	KH	Y	Lecture, Small group discussion	Written / Viva voce			
CM17.4	Describe National policies related to health and health planning and millennium development goals	K	KH	Y	Lecture, Small group discussion	Written / Viva voce			
CM17.5	Describe health care delivery in India	K	KH	Y	Lecture, Small group discussion	Written / Viva voce			
Topic: International Health		**Number of competencies: (2)**			**Number of procedures that require certionat(NIL)**				
CM18.1	Define and describe the concept of International health	K	KH	Y	Lecture, Small group discussion	Written / Viva voce			
CM18.2	Describe roles of various international health agencies	K	KH	Y	Lecture, Small group discussion	Written / Viva voce			

Number	COMPETENCY The student should be able to	Domain K/S/A/C	Level K/KH/ SH/P	Core Y/N	Suggested Teaching learning method	Suggested Assessment method	Number required to certify P	Vertical Integration	Horizontal Integration
Topic: Essential Medicine	**Number of competencies: (3)**				**Number of procedures that require certification: (NIL)**				
CM19.1	Define and describe the concept of Essential Medicine List (EML)	K	KH	Y	Lecture, Small group discussion	Written / Viva voce			Pharmacology
CM19.2	Describe roles of essential medicine in primary health care	K	KH	Y	Lecture, Small group discussion	Written / Viva voce			Pharmacology
CM19.3	Describe counterfeit medicine and its prevention	K	KH	Y	Lecture, Small group discussion	Written / Viva voce			Pharmacology
Topic: Recent advances in Community Medicine	**Number of competencies: (04)**				**Number of procedures that require certification: (NIL)**				
CM20.1	List important public health events of last five years	K	KH	Y	Lecture, Small group discussion	Written / Viva voce			
CM20.2	Describe various issues during outbreaks and their prevention	K	KH	Y	Lecture, Small group discussion	Written / Viva voce			
CM 20.3	Describe any event important to Health of the Community	K	KH	Y	Lecture, Small group discussion	Written / Viva voce			
CM 20.4	Demonstrate awareness about laws pertaining to practice of medicine such as Clinical establishment Act and Human Organ Transplantation Act and its implications	K	KH	Y	Lecture, Small group discussion	Written / Viva voce			
	Column C: K- Knowledge, S – Skill, A - Attitude / professionalism, C- Communication. **Column D: K – Knows, KH - Knows How, SH - Shows how, P- performs independently, Column F: DOAP session – Demonstrate, Observe, Assess, Perform.** **Column H: If entry is P: indicate how many procedures must be done independently for certification/ graduation**								

Intergration									
Number	**COMPETENCY The student should be able to**	**Domain K/S/A/C**	**Level K/KH/ SH/P**	**Core Y/N**	**Suggested Teaching learning method**	**Suggested Assessment method**	**Number required to certify P**	**Vertical Integration**	**Horizontal Integration**
Physiology									
PY9.6	Enumerate the contraceptive methods for male and female. Discuss their advantages & disadvantages	K	KH	Y	Lectures, Small group discussion	Written/ Viva voce		Obstetrics & Gynaecology, Community Medicine	
Biochemistry									
BI8.5	Summarize the nutritional importance of commonly used items of food including fruits and vegetables.(macro-molecules & its importance)	K	KH	Y	Lectures, Small group discussions	Written/ Viva voce		Community Medicine, General Medicine, Pediatrics	
Pathology									
PA12.1	Enumerate and describe the pathogenesis of disorders caused by air pollution, tobacco and alcohol	K	KH	Y	Lecture, Small group discussion	Written / Viva voce			Community Medicine
PA26.5	Define and describe the etiology, types, exposure, environmental influence, pathogenesis, stages, morphology, microscopic appearance and complications of Occupational lung disease	K	KH	Y	Lecture, Small group discussion	Written / Viva voce		General Medicine, Community Medicine	
PA26.7	Define and describe the etiology, types, exposure, genetics environmental influence, pathogenesis, morphology, microscopic appearance and complications of mesothelioma	K	KH	N	Lecture, Small group discussion	Written / Viva voce		General Medicine, Community Medicine	
Microbiology									
MI1.3	Describe the epidemiological basis of common infectious diseases	K	KH	Y	Lecture	Written/ Viva voce			Community Medicine
MI8.4	Describe the etiologic agents of emerging Infectious diseases. Discuss the clinical course and diagnosis	K	KH	Y	Lecture, Small group discussion	Written / Viva voce		General Medicine, Community Medicine	Community Medicine
MI8.5	Define Healthcare Associated Infections (HAI) and enumerate the types. Discuss the factors that contribute to the development of HAI and the methods for prevention	K	KH	Y	Lecture, Small group discussion	Written/ Viva voce		General Medicine, Community Medicine	
MI8.6	Describe the basics of Infection control	K	KH	Y	Lecture, Small group discussion	Written / Viva voce			

Number	COMPETENCY The student should be able to	Domain K/S/A/C	Level K/KH/ SH/P	Core Y/N	Suggested Teaching learning method	Suggested Assessment method	Number required to certify P	Vertical Integration	Horizontal Integration
MI8.7	Demonstrate Infection control practices and use of Personal Protective Equipments (PPE)	S	P	Y	DOAP session	Skill assessment	3 each in (Hand hygiene & PPE)	General Surgery	Community Medicine
MI8.16	Describe the National Health Programs in the prevention of common infectious disease (for information purpose only as taught in CM)	K	K	Y	Lecture	Written / Viva voce			
Pharmacology									
PH1.55	Describe and discuss the following National Health programmes including Immunisation, Tuberculosis, Leprosy, Malaria, HIV, Filaria, Kala Azar, Diarrhoeal diseases, Anaemia & nutritional disorders, Blindness, Non-communicable diseases, Cancer and Iodine deficiency	K	KH	Y	Lecture	Written / Viva voce			Community Medicine
Forensic Medicine & Toxicology									
FM2.33	Demonstrate ability to use local resources whenever required like in mass disaster situations	A & C	KH	Y	Lecture, Small group discussions	Written/ Viva voce		Community Medicine	
Dermatology, Venereology & Leprosy									
DR9.1	Classify, describe the epidemiology, etiology, microbiology pathogenesis and clinical presentations and diagnostic features of Leprosy	K	KH	Y	Lecture, Small group discussions	Written / Viva voce		General Medicine	Microbiology, Community Medicine
DR9.5	Enumerate the indications and describe the pharmacology, administration and adverse reaction of pharmacotherapies for various classes of leprosy based on national guidelines	K	KH	Y	Lecture, Small group discussions	Written / Viva voce		General Medicine	Pharmacology, Community Medicine
DR9.6	Describe the treatment of Leprosy based on the WHO guidelines	K	KH	Y	Lecture, Small group discussions	Written / Viva voce		General Medicine	Pharmacology, Community Medicine
Ophthalmology									
OP9.4	Enumerate, describe and discuss the causes of avoidable blindness and the National Programs for Control of Blindness (including vision 2020)	K	KH	Y	Lecture, Small group discussions	Written / Viva voce			Community Medicine

Number	COMPETENCY The student should be able to	Domain K/S/A/C	Level K/KH/ SH/P	Core Y/N	Suggested Teaching learning method	Suggested Assessment method	Number required to certify P	Vertical Integration	Horizontal Integration
Psychiatry									
PS19.1	Describe the relevance, role and status of community psychiatry	K	KH	Y	Lecture, Small group discussion	Written / Viva voce		Community Medicine	
PS19.2	Describe the objectives strategies and contents of the of the National Mental Health Programme	K	KH	Y	Lecture, Small group discussion	Written / Viva voce		Community Medicine	
PS19.4	Enumerate and describe the salient features of the prevalent mental health laws in India	K	KH	Y	Lecture, Small group discussion	Written / Viva voce		Community Medicine	
PS19.5	Describe the concept and principles of preventive psychiatry and mental health promotion (positive mental health); and community education	K	KH	Y	Lecture, Small group discussion	Written / Viva voce		Community Medicine	
General Medicine									
IM2.1	Discuss and describe the epidemiology, antecedents and risk factors for atherosclerosis and ischemic heart disease	K	KH	Y	Lecture, Small group discussion	Written / Viva voce		Pathology, Physiology, Community Medicine	
IM4.3	Discuss and describe the common causes, pathophysiology and manifestations of fever in various regions in India including bacterial, parasitic and viral causes (e.g. Dengue, Chikungunya, Typhus)	K	K	Y	Lecture, Small group discussion	Written		Microbiology, Community Medicine	
IM9.15	Describe the national programs for anemia prevention	K	KH	Y	Lecture, Small group discussion	Written / Viva voce		Pharmacology, Community Medicine	
IM12.12	Describe and discuss the iodisation programs of the government of India	K	KH	Y	Lecture, Bedside clinic	short note		Community Medicine	
IM14.4	Describe and discuss the impact of environmental factors including eating habits, food, work, environment and physical activity on the incidence of obesity	K	K	Y	Lectures, Small group discussions	short note/ Viva voce		Pathology, Community Medicine	
IM24.18	Describe the impact of the demographic changes in ageing on the population	K	KH	Y	Lecture, Small group discussion	Written / Viva voce		Community Medicine	

Number	COMPETENCY The student should be able to	Domain K/S/A/C	Level K/KH/ SH/P	Core Y/N	Suggested Teaching learning method	Suggested Assessment method	Number required to certify P	Vertical Integration	Horizontal Integration
IM25.1	Describe and discuss the response and the influence of host immune status, risk factors and comorbidities on zoonotic diseases (e.g. Leptospirosis, Rabies) and non-febrile infectious disease (e.g. Tetanus)	K	K	Y	Lecture, Small group discussion	Written		Microbiology, Community Medicine	
IM25.2	Discuss and describe the common causes, pathophysiology and manifestations of these diseases	K	K	Y	Lecture, Small group discussion	Written		Microbiology, Community Medicine	
IM25.4	Elicit document and present a medical history that helps delineate the aetiology of these diseases that includes the evolution and pattern of symptoms, risk factors, exposure through occupation and travel	S	SH	Y	Bedside clinic, DOAP session	Skill assessment		Community Medicine	
IM25.13	Counsel the patient and family on prevention of various infections due to environmental issues	C	SH	Y	DOAP session	Skill assessment		Community Medicine, General Medicine	
Obstetrics & Gynaecology									
OG1.1	Define and discuss birth rate, maternal mortality and morbidity	K	KH	Y	Lecture, Small group discussions	Short notes		Community Medicine	
OG1.2	Define and discuss perinatal mortality and morbidity including perinatal and neonatal mortality and morbidity audit	K	KH	Y	Lecture, Small group discussions	Short notes		Community Medicine	Pediatrics
OG8.1	Enumerate describe and discuss the objectives of antenatal care, assessment of period of gestation; screening for high-risk factors	K	KH	Y	Small group discussions, Bedside clinics, Lecture	Written / Viva voce/ Skill assessment		Community Medicine	
OG19.2	Counsel in a simulated environment, contraception and puerperal sterilisation	S/A/C	SH	Y	DOAP session	Skill assessment		Community Medicine	
OG21.1	Describe and discuss the temporary and permanent methods of contraception, indications, technique and complications; selection of patients, side effects and failure rate including OC, male contraception, emergency contraception and IUCD	K	KH	Y	Lecture, Small group discussions, Bedside clinics	Written / Viva voce/ Skill assessment		Community Medicine	
OG33.3	Describe and demonstrate the screening for cervical cancer in a simulated environment	K/S	SH	Y	DOAP session	Skill assessment		Community Medicine	
Pediatrics									

Number	COMPETENCY The student should be able to	Domain K/S/A/C	Level K/KH/ SH/P	Core Y/N	Suggested Teaching learning method	Suggested Assessment method	Number required to certify P	Vertical Integration	Horizontal Integration
PE3.5	Discuss the role of the child developmental unit in management of developmental delay	K	K	N	Lecture, Small group discussion	Written/ Viva voce		Community Medicine	
PE3.7	Visit a Child Developmental unit and observe its functioning	S	KH	Y	Lecture, Small group discussion	Log book Entry		Community Medicine	
PE8.1	Define the term Complementary Feeding	K	K	Y	Lecture, Small group discussion	Written/ Viva voce		Community Medicine	
PE8.2	Discuss the principles the initiation, attributes , frequency, techniques and hygiene related to complementary feeding including	K	KH	Y	Lecture, Small group discussion	Written / Viva voce		Community Medicine	
PE8.3	Enumerate the common complimentary foods	K	K	Y	Lecture, Small group discussion	Written / Viva voce		Community Medicine	
PE8.4	Elicit history on the Complementary Feeding habits	S	SH	Y	Bedside clinics, Skills lab	Skill Assessment		Community Medicine	
PE8.5	Counsel and educate mothers on the best practices in Complimentary Feeding	A/C	SH	Y	DOAP session	Document in Log Book		Community Medicine	
PE9.1	Describe the age related nutritional needs of infants, children and adolescents including micronutrients and vitamins	K	KH	Y	Lecture, Small group discussion	Written / Viva voce		Community Medicine, Biochemistry	
PE9.2	Describe the tools and methods for Assessment and classification of Nutritional status of infants, children and adolescents	K	KH	Y	Lecture, Small group discussion,	Written / Viva voce		Community Medicine	
PE9.4	Elicit, Document and present an appropriate nutritional history and perform a dietary recall	S	SH	Y	Bedside clinic, Skill Lab	Skill Assessment		Community Medicine	
PE9.5	Calculate the age related Calorie requirement in Health and Disease and identify gap	S	SH	Y	Bedside clinics, Small group discussion	Skill assessment		Community Medicine	
PE9.6	Assess and classify the nutrition status of infants, children and adolescents and recognize deviations	S	SH	Y	Bedside clinic, Small group discussion	Skill Assessment		Community Medicine	
PE9.7	Plan an appropriate diet in Health and disease	S	SH	N	Bedside clinic, Small group discussion	Document in logbook		Community Medicine	

Number	COMPETENCY The student should be able to	Domain K/S/A/C	Level K/KH/ SH/P	Core Y/N	Suggested Teaching learning method	Suggested Assessment method	Number required to certify P	Vertical Integration	Horizontal Integration
PE10.4	Identify children with under nutrition as per IMNCI criteria and plan referral	S	SH	Y	DOAP session	Document in log book		Community Medicine	
PE17.1	State the vision and outline the goals, strategies and plan of action of NHM and other important national programs pertaining to maternal and child health including RMNCH A+, RBSK, RKSK, JSSK mission Indradhanush and ICDS	K	KH	Y	Lecture, Small group discussion	Written/ Viva voce		Community Medicine	
PE17.2	Analyse the outcomes and appraise the monitoring and evaluation of NHM	K	KH	Y	Debate	Written/ Viva voce		Community Medicine	
PE18.1	List and explain the components, plans, outcomes of Reproductive child health (RCH) program and appraise the monitoring and evaluation	K	KH	Y	Lecture, Small group discussion	Written / Viva voce		Community Medicine	Obstetrics & Gynaecology
PE18.2	Explain preventive interventions for Child survival and safe motherhood	K	KH	Y	Lecture, Small group discussion	Written/ Viva voce		Community Medicine	Obstetrics & Gynaecology
PE18.3	Conduct Antenatal examination of women independently and apply at-risk approach in antenatal care	S	SH	Y	Bedside clinics	Skill station		Community Medicine	Obstetrics & Gynaecology
PE18.4	Provide intra-natal care and conduct a normal Delivery in a simulated environment	S	SH	Y	DOAP session, Skills lab	Document in Log Book		Community Medicine	Obstetrics & Gynaecology
PE18.6	Perform Postnatal assessment of newborn and mother, provide advice on breast feeding, weaning and on family planning	S	SH	Y	Bedside clinics, Skill Lab	Skill Assessment		Community Medicine	Obstetrics & Gynaecology
PE18.8	Observe the implementation of the program by Visiting the Rural Health Centre	S	KH	Y	Bedside clinics, Skill Lab	Document in log book		Community Medicine	Obstetrics & Gynaecology
PE19.1	Explain the components of the Universal immunization Program and the sub National Immunization Programs	K	KH	Y	Lecture, Small group discussion	Written/ Viva voce		Community Medicine, Microbiology	
PE19.2	Explain the epidemiology of Vaccine preventable diseases	K	KH	Y	Lecture, Small group discussion	Written/ Viva voce		Community Medicine, Microbiology	
PE19.3	Vaccine description with regard to classification of vaccines, strain used, dose, route, schedule, risks, benefits and side effects, indications and contraindications	K	KH	Y	Lecture, Small group discussion	Written/ Viva voce		Community Medicine, Microbiology	
PE19.4	Define cold chain and discuss the methods of safe storage and handling of vaccines	K	KH	Y	Lecture, Small group discussion	Written / Viva voce		Community Medicine, Microbiology	

Number	COMPETENCY The student should be able to	Domain K/S/A/C	Level K/KH/ SH/P	Core Y/N	Suggested Teaching learning method	Suggested Assessment method	Number required to certify P	Vertical Integration	Horizontal Integration
PE19.5	Discuss immunization in special situations – HIV positive children, immunodeficiency, preterm , organ transplants, those who received blood and blood products, splenectomised children, Adolescents, travellers	K	KH	Y	Lecture, Small group discussion	Written / Viva voce		Community Medicine, Microbiology	
PE19.8	Demonstrate willingness to participate in the National and sub national immunisation days	A	SH	Y	Lecture, Small group discussion	Document in Log Book		Community Medicine	
PE19.12	Observe the Administration the UIP vaccines	S	SH	Y	DOAP session	Document in Log Book		Community Medicine	
PE29.5	Discuss the National anaemia Control program	K	KH	Y	Lecture, Small group discussion	Written / Viva voce		Community Medicine	
PE34.3	Discuss the various regimens for management of Tuberculosis as per National Guidelines	K	KH	Y	Lecture, Small group discussion	Written/ Viva voce		Microbiology, Community Medicine, Pharmacology	Respiratory Medicine
PE34.4	Discuss the preventive strategies adopted and the objectives and outcome of the National Tuberculosis Control Program	K	KH	Y	Lecture, Small group discussion	Written/ Viva voce		Microbiology, Community Medicine, Pharmacology	Respiratory Medicine
General Surgery									
SU7.1	Describe the Planning and conduct of Surgical audit	K	KH	Y	Lecture, Small group discussion	Written / Viva voce		Community Medicine	
SU7.2	Describe the principles and steps of clinical research in surgery	K	KH	Y	Lecture, Small group discussion	Written / Viva voce		Community Medicine	

Number	COMPETENCY The student should be able to	Domain K/S/A/C	Level K/KH/ SH/P	Core Y/N	Suggested Teaching learning method	Suggested Assessment method	Number required to certify P	Vertical Integration	Horizontal Integration
Respiratory Medicine									
CT1.1	Describe and discuss the epidemiology of tuberculosis and its impact on the work, life and economy of India	K	KH	Y	Lecture, Small group discussion	Written / Viva voce		Community Medicine	
CT1.4	Describe the epidemiology, the predisposing factors and microbial and therapeutic factors that determine resistance to drugs	K	KH	Y	Lecture, Small group discussion	Written / Viva voce		Community Medicine, Microbiology, Pharmacology	
CT1.15	Prescribe an appropriate antituberculosis regimen based on the location of disease, smear positivity and negativity and co-morbidities based on current national guidelines including directly observed tuberculosis therapy (DOTS)	K	SH	Y	Bedside clinic, Small group discussion, Lecture	Skill assessment		Pharmacology, Community Medicine	
CT1.16	Describe the appropriate precautions, screening, testing and indications for chemoprophylaxis for contacts and exposed health care workers	K	KH	Y	Bedside clinic, Small group discussion	Written		Community Medicine	
CT1.18	Educate health care workers on national programs of Tuberculosis and administering and monitoring the DOTS program	C	SH	Y	DOAP session	Skill assessment		Community Medicine	
CT2.24	Recognise the impact of OAD on patient’s quality of life, well being, work and family	A	KH	Y	Small group discussion, Bedside clinic	Observation by faculty		Community Medicine	
CT2.25	Discuss and describe the impact of OAD on the society and workplace	K	KH	Y	Lecture, Small group discussion	Written / Viva voce		Community Medicine	
CT2.26	Discuss and describe preventive measures to reduce OAD in workplaces	K	KH	Y	Lecture,Small group discussion	Written / Viva voce		Community Medicine	
CT2.27	Demonstrate an understanding of patient’s inability to change working, living and environmental factors that influence progression of airway disease	A	KH	Y	Small group discussion, Bedside clinic	Observation by faculty		Community Medicine	

TIMETABLE – MASTER, CLASS & TEACHER TOPIC SCHEDULE

TIMETABLE – MASTER & CLASS AND TEACHER TOPIC TIMETABLE

VELAMMAL MEDICAL COLLEGE HOSPITAL & RESEARCH INSTITUTE
VELAMMAL VILLAGE , ANUPPANADI, MADURAI
TIME TABLE FOR 3rd YEAR MBBS PHASE - III - PART -I - 2019-2020 BATCH

Time Table for Clinical Posting Schedule
Timing : 09.00am to 12.00noon

Date	01.04.2022 to 30.04.2022	01.05.2022 to 31.05.2022	01.06.2022 to 30.06.2022	01.07.2022 to 31.07.2022	01.08.2022 to 31.08.2022	01.09.2022 to 30.09.2022
Batch- A	MEDICINE	SURGERY	OBG	CM	PAED	ORTHO
Batch- B	SURGERY	OBG	CM	PAED	ORTHO	MEDICINE
Batch- C	OBG	CM	PAED	ORTHO	MEDICINE	SURGERY
Batch- D	CM	PAED	ORTHO	MEDICINE	SURGERY	OBG
Batch- E	PAED	ORTHO	MEDICINE	SURGERY	OBG	CM
Batch- F	ORTHO	MEDICINE	SURGERY	OBG	CM	PAED

Batch	Roll.no
Batch - A	1 to 25
Batch - B	26 to 50
Batch - C	51 to 75
Batch - D	76 to 100
Batch - E	101 to 125
Batch -F	126 to 150

VICE PRINCIPAL

VELAMMAL MEDICAL COLLEGE HOSPITAL & RESEARCH INSTITUTE
Velammal Village, Madurai – 625009
TIME TABLE FOR SECOND YEAR MBBS – 2019– 2020 BATCH -
With Effect From 16.08.2021

DAY	8.00 AM - 09.00 AM	09.00 AM - 10.00 AM	10.00 AM - 01.00 PM	01.00 PM- 02.00 PM	02.00 PM -04.00 PM Practical Classes		
					Pharmacology Pratical	Pathology Pratical	Microbiology Pratical
MONDAY	Pharmacology	Microbiology	Clinical Posting	LUNCH BREAK	A- Batch	B- Batach	C- Batch
TUESDAY	General Surgery	Community Medicine	Clinical Posting		B- Batach	C- Batch	A- Batch
WEDNESDAY	Pathology	Pharmacology	Clinical Posting		C- Batch	A- Batch	B- Batach
THURSDAY	Microbiology	Pathology	Clinical Posting		Pharmacology		
FRIDAY	General Medicine	Pathology	Clinical Posting		Pathology		
SATURDAY	Forensic Medicine	1st week -Pharmacology 3rd week- Pathology 4th week - Forensic Medicine 5th week- Microbiology	Clinical Posting		Microbiology		

VICE PRINCIPAL

VELAMMAL MEDICAL COLLEGE HOSPITAL & RESEARCH INSTITUTE

VELAMMAL VILLAGE , ANUPPANADI, MADURAI

TIME TABLE FOR 2nd YEAR MBBS - 2019-2020 BATCH

Clinical Posting Schedule From 16.08.2021 to 31.08.2021					
Dated : 16.08.2021 to 24.08.2021 Timing: 10am to 1pm			Dated : 25.08.2021 to 31.08.2021 Timing: 10am to 1pm		
Batch - A	10am to 01.00PM	General Medicine	Batch- B	10am to 01.00PM	General Medicine
Batch -B	10am to 01.00PM	General Surgery	Batch - A	10am to 01.00PM	General Surgery
Group -A - Roll.no: 1 to 78 Group -B - Roll.no: 79 to 157					

Clinical Posting Schedule from 01.09.2021 to 31.12.2021 Timing : 10.00am to 01.00pm				
Date	01.09.2021 to 30.09.2021	01.10.2021 to 31.10.2021	01.11.2021 to 30.11.2021	01.12.2021 to 31.12.2021
Batch- A	GM	GS	CM	OBG
Batch- B	GS	CM	OBG	GM
Batch- C	CM	OBG	GM	GS
Batch- D	OBG	GM	GS	CM

Batch	Roll.no
Batch - A	1 to 39
Batch - B	40 to 78
Batch - C	79 to 117
Batch - D	118 to 157

VICE PRINCIPAL

VELAMMAL MEDICAL COLLEGE HOSPITAL & RESEARCH INSTITUTE

VELAMMAL VILLAGE , ANUPPANADI, MADURAI

TIME TABLE FOR 2nd YEAR MBBS - 2019-2020 BATCH

Clinical Posting Schedule from 01.01.2022 to 28.02.2022 Timing : 10.00am to 01.00pm				
Date	01.01.2022 to 15.01.2022	16.01.2022 to 31.01.2022	01.02.2022 to 15.02.2022	16.02.2022 to 28.02.2022
Batch- A	Psychiatry	Radiology	Chest & TB	Dermatology
Batch- B	Radiology	Chest & TB	Dermatology	Psychiatry
Batch- C	Chest & TB	Dermatology	Psychiatry	Radiology
Batch- D	Dermatology	Psychiatry	Radiology	Chest & TB

Batch	Roll.no
Batch - A	1 to 39
Batch - B	40 to 78
Batch - C	79 to 117
Batch - D	118 to 150

VICE PRINCIPAL

VELAMMAL MEDICAL COLLEGE HOSPITAL & RESEARCH INSTITUTE
VELAMMAL VILLAGE , ANUPPANADI, MADURAI
TIME TABLE FOR 3rd YEAR MBBS PHASE - III - PART -I - 2019-2020 BATCH

Time Table for Clinical Posting Schedule Timing : 09.00am to 12.00noon						
Date	**01.10.2022 to 15.10.2022**	**16.10.2022 to 31.10.2022**	**01.11.2022 to 15.11.2022**	**16.11.2022 to 30.11.2022**	**01.12.2022 to 15.12.2022**	**16.12.2022 to 31.12.2022**
Batch- A	OPHTHAL	ENT	PSYCHIATRY	DERMATOLOGY	DENTISTRY	CASULATY
Batch- B	ENT	PSYCHIATRY	DERMATOLOGY	DENTISTRY	CASULATY	OPHTHAL
Batch- C	PSYCHIATRY	DERMATOLOGY	DENTISTRY	CASULATY	OPHTHAL	ENT
Batch- D	DERMATOLOGY	DENTISTRY	CASULATY	OPHTHAL	ENT	PSYCHIATRY
Batch- E	DENTISTRY	CASULATY	OPHTHAL	ENT	PSYCHIATRY	DERMATOLOGY
Batch- F	CASULATY	OPHTHAL	ENT	PSYCHIATRY	DERMATOLOGY	DENTISTRY

Batch	**Roll.no**
Batch - A	**1 to 25**
Batch - B	**26 to 50**
Batch - C	**51 to 75**
Batch - D	**76 to 100**
Batch - E	**101 to 125**
Batch -F	**126 to 150**

VICE PRINCIPAL

Online Theory classes Schedule, August 2021

Batch – 2019-20 Day: Friday

S. No	Date	Topic	Time	Faculty Name
1.	06.08.2021	Acute diarrhoeal disease	10.30 am to 11.30 am	Dr. Sriandaal
2.	06.08.2021	Cholera	11.30 am to 12.30 am	Dr. Omar
3.	13.08.2021	Typhoid	10.30 am to 11.30 am	Dr. Sudharsan
4.	13.08.2021	Food poisoning & Amoebiasis	11.30 am to 12.30 am	Dr. Trupti
5.	20.08.2021	Soil transmitted helminthiasis including dracunculiasis	10.30 am to 11.30 am	Dr. Sudhir
6.	20.08.2021	Malaria I	11.30 am to 12.30 am	Dr. Munish
7.	27.08.2021	The Dengue syndrome	10.30 am to 11.30 am	Dr. Samir
8.	27.08.2021	Malaria II	11.30 am to 12.30 am	Dr. Trupti

Online Practical classes Schedule, August 2021

Batch – 2019-20 Day: Thursday

S. N	Date	Topic	Time	Teaching learning tool	Faculty Name
1.	05.08.2021	History of Outbreaks, Epidemics & Pandemics (F1)	2 pm to 4 pm	Pre-test and interactive theory session	Dr. Sudhir

Theory classes Schedule, September 2021
Batch – 2019-20 Day: Tuesday

S. No	Date	Topic	Time	Faculty Name
1.	07.09.2021	CM 8.1 Soil transmitted helminthiasis including dracunculiasis	09.00 am to 10.00 am	Dr. Sudhir
2.	14.09.2021	CM 8.1 Typhoid	09.00 am to 10.00 am	Dr. Sudharsan
3.	21.09.2021	CM 8.1. & CM 3.7 The Dengue syndrome	09.00 am to 10.00 am	Dr. Sriandaal
4.	28.09.2021	CM 8.1. & CM 3.7 Malaria I	09.00 am to 10.00 am	Dr. Trupti

Theory Classes Schedule, September 2021

Practical classes Schedule, September 2021
MBBS Batch: 2019-20 Posting Batch: C Time: 10 am – 1 pm

SN	Date	Topic	Teacher	Time
1.	01-09-21	Orientation to family health survey & diet survey	Dr. Samir	10 am to 1 pm
2.	02-09-21	Introduction to vaccines	Dr.Samir	10 - 11.30 am
		BCG, OPV & Rota virus	Dr. Sudhir	11.30-1 pm
3.	03-09-21	Family Health Survey I	Dr. Sudharsan	10 am to 1 pm
4.	04-09-21	Family Health Survey II	Dr. Sudharsan	10 am to 1 pm
5.	06-09-21	Family Health Survey III	Dr. Sriandaal	10 am to 1 pm
6.	07-09-21	Diet survey I	Dr. Sriandaal	10 am to 1 pm
7.	08-09-21	Diet survey II	Dr. Sudharsan	10 am to 1 pm
8.	09-09-21	Sanitary & insanitary well, Step well & Horrock's apparatus	Dr. Samir	10 am to 1 pm
9.	13-09-21	Diet Survey III	Dr. Sriandaal	10 am to 1 pm
10.	14-09-21	Vaccines - Rabies, Td & Typhoid	Dr. Trupti	10 - 11.30 am
		Vaccines – MMR, Measles, Vit.A , AD & Tuberculin syringe	Dr. Sudhir	11.30 - 1 pm
11.	15-09-21	Cold chain system and drug warehouse visit	Dr. Sudhir	10 am to 1 pm
12.	16-09-21	AMK Old Age Home	Dr. Trupti	10 am to 1 pm
13.	17-09-21	Water treatment plant - Manaloor visit	Dr. Sriandaal	10 am to 1 pm
14.	23-09-21	Excellence laboratory (water Analysis) – Visit	Dr. Sriandaal	10 am to 1 pm
15.	24-09-21	Sewage treatment plant	Dr.Trupti	10 am to 1 pm

16.	25-09-21	Solid waste management- Vellaikkal visit	Dr. Sudharsan	10 am to 1 pm
17.	27-09-21	Bleaching powder, Disinfectants, Savlon & Rain water harvesting	Dr. Sudharsan	10 - 11.30 a.m.
		Statistics	Mr .Vijay	11.30 - 1 pm
18.	28-09-21	All entomological sides	PG's	10 - 12 p.m.
		Insecticides, Mosquito repellants & Rodenticides	Dr. Sriandaal	12- 1 pm
19.	29-09-21	FHS report presentation	Dr. Samir & Mr. Vijay	10 am to 1 pm
20.	30-09-21	Record submission & End posting examination	All faculty	10 am to 1 pm

Clinical posting schedule, Oct - Nov 2021

Batch – 2018-19 Batches: A Time: 9:00 a.m. – 1:00 p.m

S. N	Date	9am-11am	11-01pm
1.	06-10-2021	Community Survey , Dr. Sudharsan	
2.	07-10-2021	Community Activity Dr. Sriandaal	
3.	08-10-2021	School & Community Activity, Dr. Sriandaal	
4.	11-10-2021	Morbidity Statistics Dr. Sudharsan	CSC-DM Dr. Sudhir
5.	12-10-2021	Mortality Statistics Dr. Sudhir	CSC-ANC Dr. Sriandaal
6.	13-10-2021	Screening Dr. Sudhir	CSC-DM Dr. Sudhir
7.	18-10-2021	CSC- orientation case Dr. Trupti	Statistics Mr. Vijay Anto
8.	19-10-2021	Statistics Mr. Vijay Anto	Malaria exercises Dr. Samir
9.	20-10-2021	Measures of association Dr. Sudhir	Statistics Mr. Vijay Anto
10.	21-10-2021	Family & Diet survey Dr. Sudharsan	
11.	22-10-2021	CSC: ADD Dr. Sriandaal	Vaccine requirement Dr. Samir
12.	23-10-2021	CSC: ARTI Dr. Sudhir	Statistics Mr. Vijay Anto
13.	25-10-2021	CSC: TB Dr. Trupti	Statistics Mr. Vijay Anto

14.	26-10-2021	CSC: Dengue Dr. Sudharsan	Statistics Mr. Vijay Anto
15.	27-10-2021	CSC: CHD Dr. Trupti	Statistics Mr. Vijay Anto
16.	28-10-2021	Regional Vaccine center & drug warehouse Dr. Sudharsan	
17.	29-10-2021	OSPE (11-20) Dr. Trupti	Statistics Mr. Vijay Anto
18.	30-10-2021	CSC: Under 5 Child Dr. Trupti	Epi.Demography Dr.Sudharsan
19.	02-11-2021	CSC: hypertension Dr. Trupti	Association / TB Dr.Sudharsan
20.	08-11-2021	OSPE (61-78) Dr. Sriandaal	CSC: Adolescent Girl Dr. Samir
21.	09-11-2021	OSPE (41-53) Dr. Trupti	OSPE (54-65) Dr. Sudhir
22.	10-11-2021	OSPE (11-25) Dr. Sudhir	CSC: Typhoid Dr. Trupti
23.	11-11-2021	Spotter revision Communicable disease & Entomology : Dr. Sriandaal	OSPE (25-40) Dr. Samir
24.	12-11-2021	CSC: Leprosy Dr. Sudhir	Filaria exercise Dr. Samir
25.	13-11-2021	End Posting Exam (Epidemiology, statistical exercises, OSPE and spotter) All Faculties	

Theory classes Schedule, October 2021
Batch – 2019-20 Day: Tuesday

S. No	Date	Topic	Time	Faculty Name
1.	05.10.2021	Entomological slides	09.00 am to 10.00 am	Dr. Sriandaal
2.	12.10.2021	JE	09.00 am to 10.00 am	Dr. Sudhir
3.	19.10.2021	Malaria II	09.00 am to 10.00 am	Dr. Trupti
4.	26.10.2021	Rabies	09.00 am to 10.00 am	Dr. Sudharsan

Practical classes Schedule, October 2021
MBBS Batch: 2019-20 Posting Batch: B Time: 10 am – 1 pm

SN	Date	Topic	Teacher	Time
1.	01-10-21	Orientation to family health survey & diet survey	Dr. Sudhir	10 am to 1 pm
2.	04-10-21	Basics of biostatistics and data entry	Mr. Vijay	10 am to 1 pm
3.	05-10-21	Introduction to vaccines	Dr. Dinesh	10 - 11.30 am
		Vaccines – MMR, Measles, Vit.A , AD & Tuberculin syringe	Dr. Sriandaal	11.30 - 1 pm
4.	06-10-21	Family Health Survey II	Dr. Sudharsan	10 am to 1 pm
5.	07-10-21	Community Activity	Dr. Sriandaal	10 am to 1 pm
6.	08-10-21	School and Community Activity	Dr. Sriandaal	10 am to 1 pm
7.	11-10-21	Diet survey I	Dr. Sriandaal	10 am to 1 pm
8.	12-10-21	Diet survey II	Dr. Sudharsan	10 am to 1 pm
9.	13-10-21	Diet Survey III	Dr. Sriandaal	10 am to 1 pm
10.	18-10-21	Sanitary & insanitary well, Step well & Horrock's apparatus	Dr. Sudharsan	10 - 11.30 am
		Slow sand filter, Rapid sand filter & Chloroscope	Dr. Dinesh	11.30 - 1 pm
11.	19-10-21	Water treatment plant - Manaloor visit	Dr. Trupti	10 am to 1 pm
12.	20-10-21	Deep trench latrine, Septic tank, Bore hole latrine Bio gas plant and Oxidation pond	Dr.Samir	10 - 11.30 am
		House drainage system, Modern sewage treatment plant, Activated sludge process	Dr. Dinesh	11.30am- 1 pm
13.	21-10-21	Ticks, mites, Bug & Leishmaniasis (Slide + model)	Dr. Sudhir	10 - 11.30 am
		Mosquito entomology morphology	Dr.Samir	11.30 - 1 pm
14.	22-10-21	Cold chain system and drug warehouse visit	Dr. Sudhir	10 am to 1 pm
15.	23-10-21	Pasteur Chamberland filter, Berkfeld filter, still for distilled water, & water hardness kit	Dr. Sriandaal	10 - 11.30 a.m.
		Bleaching powder, Disinfectants, Savlon & Rain	Dr. Sudharsan	11.30 - 1 pm

		water harvesting		
16.	25-10-21	Excellence laboratory (water Analysis) – Visit	Dr. Sudharsan	10 am to 1 pm
17.	26-10-21	Sewage treatment plant	Dr. Sriandaal	10 am to 1 pm
18.	27-10-21	Solid waste management- Vellaikkal visit	Dr. Sudharsan	10 am to 1 pm
19.	28-10-21	Insecticides, Mosquito repellants & Rodenticides	Dr. Trupti	10 - 11.30 a.m.
		Vaccines – MMR, Measles, Vit.A	Dr.Dinesh	11.30 - 1 pm
20.	29-10-21	All entomological sides	Dr. Sriandaal	10 - 11.30 a.m.
		Vaccines - JE, Typhoid, Rota virus	Dr.Balakumaran	11.30 - 1 pm
21.	30-10-21	Record submission & End posting examination	All faculty	10 am to 1 pm

Clinical posting schedule, Nov-Dec 2021

Batch – 2018-19 Batch: B Time: 9:00 a.m. – 1:00 p.m

S. No	Date	9am-11am	11-01pm
26.	15-11-2021	Diet Survey, Dr. Sudharsan	
27.	16-11-2021	Health survey, Dr. Sriandaal	
28.	17-11-2021	Health survey, Dr. Sudharasan	
29.	18-11-2021	Certificate course	
30.	19-11-2021	Certificate course	
31.	20-11-2021	Statistics Mr. Vijay Anto	Screening Dr. Trupti
32.	22-11-2021	Mortality Dr. Samir	Avain visit Dr.Sudhir
33.	23-11-2021	PHC, Subcentre and Anganwadi visit Dr. Sriandaal	
34.	24-11-2021	Statistics Mr. Vijay Anto	Malaria exercises Dr. Samir
35.		Regional Vaccine center & drug ware house and Aavin diary Dr. Sudhir	
36.	25-11-2021	CSC: ANC Dr. Sudhir	Statistics Mr. Vijay Anto
37.	26-11-2021	CSC: PNC Dr. Trupti	Statistics Mr. Vijay Anto
38.	27-11-2021	CSC: TB Dr. Trupti	Statistics Mr. Vijay Anto

39.	29-11-2021	CSC: DM Dr. Sudhir	Epi Exercise: Demography Dr. Sudharsan	
40.	30-11-2021	CSC: HT Dr. Sudharsan	Tuberculosis exercise Dr. Sudhir	
41.	01-12-2021	CSC: Dengue Dr. Sriandaal	Statistics Mr. Vijay Anto	
42.	02-12-2021	Diet Survey Dr. Sudhir		
43.	03-12-2021	CSC: DM Dr. Samir	Vaccine requirement Dr. Trupti	
44.	04-12-2021	Filaria exercise Dr. Samir	Measures of association Dr. Sudhir	
45.	06-12-2021	CSC: Under 5 Child Dr. Trupti	OSPE (1-10) Dr. Sriandaal	
46.	09-12-2021	OSPE (21-30) Dr. Sudhir	OSPE (31-40) Dr. Sudharsan	Statistics Mr. Vijay Anto
47.	13-12-2021	CSC: Adolescent Girl Dr. Trupti	OSPE (51-60) Dr. Sudharsan	
48.	14-12-2021	CSC: PNC Dr. Samir	OSPE (61-70) Dr. Sudhir	
49.	15-12-2021	CSC: ARTI Dr. Samir	OSPE (71-80) Dr. Sriandaal	
50.	16-12-2021	OSPE (11-20) Dr. Trupti	Statistics Mr. Vijay Anto	
51.	17-12-2021	Spotter Nutrition & MCH: Dr. Sriandaal	Spotter Environment & Public health lab Dr. Balakumaran	
52.	18-12-2021	Spotter revision Communicable disease & Entomology Spotter revision Occupational safety : Dr. Sriandaal		
53.	21-12-2021	Solid waste management plant , Sewage treatment plant Dr. Sudharsan		

Practical classes Schedule, November 2021

MBBS Batch: 2019-20 b Posting Batch: A Time: 10 am – 1 pm

SN	Date	Topic	Teacher	Time
1.	01-11-21	Orientation to family health survey & diet survey	Dr. Trupti	10 am to 1 pm
2.	02-11-21	Family Health Survey I	Dr. Sriandaal	10 am to 1 pm
3.	08-11-21	Family Health Survey II	Dr. Sudharsan	10 am to 1 pm
4.	09-11-21	Basics of biostatistics and data entry	Mr. Vijay	10 am to 1 pm
5.	10-11-21	Introduction to vaccines	Dr. Samir	10 - 11.30 am
		Vaccine BCG, Hepatitis ,	Dr.Balakumaran	11.30 - 1 pm

		OPV&IPV		
6.	11-11-21	Diet survey I	Dr. Sriandaal	10 am to 1 pm
7.	12-11-21	Family health survey / Diet survey II	Dr. Sriandaal	10 am to 1 pm
8.	13-11-21	Sanitary & insanitary well, Step well & Horrock's apparatus	Dr. Samir	10 - 11.30 am
		Slow sand filter, Rapid sand filter & Chloroscope	Dr.Trupti	11.30 - 1 pm
9.	15-11-21	Solid waste management- Vellaikkal visit	Dr. Sriandaal	10 am to 1 pm
10.	16-11-21	Sewage treatment plant	Dr. Sudhir	10 am to 1 pm
11.	17-11-21	Vaccines – MMR, Measles, Vit.A , AD & Tuberculin syringe	Dr.Trupti	10 - 11.30 am
		Cold chain system and drug warehouse visit	Dr. Sudhir	11.30 - 1 pm
12.	18-11-21	Rotavirus, Pneumococcal vaccine Rabies, Typhoid & JE:	Dr.Sudhir	10 - 11 am
		Deep trench latrine, Septic tank, Bore hole latrine Bio gas plant and Oxidation pond	Dr.Trupti	11 - 12.noon
		House drainage system, Modern sewage treatment plant, Activated sludge process	Dr.Sudhir	12- 1 pm
13.	19-11-21	Water treatment plant - Manaloor visit	Dr. Sudharsan	10 am to 1 pm
14.	20-11-21	Academic activity	Dr. Sudharsan Dr. Sriandaal	10 am to 1 pm
15.	25-11-21	Spotter revision	Dr. Trupti	10 - 11.30 am
		Spotter revision	Dr.Sudhir	11.30 - 1 pm
16.	26-11-21	Entomology slides : Tick , fleas	Dr.Sudhir	10 - 11.30 am
		Entomology slides : Aedes, larva	Dr. Trupti	11.30 - 1 pm
17.	27-11-21	End posting	All Faculty	10 am to 1 pm

Theory Classes Schedule, November 2021

Batch – 20-21 Day: Friday Time: 8-10 am

Sr. No	Date	Time	Competency	Faculty
1.	12.11.21	8 AM- 9 AM	CM 3.7 Identify and describe the identifying features and life cycles of vectors of Public Health importance and their control measures	Dr. Sudhir
2.	12.11.21	9 AM- 10 AM	CM 4.2 Describe the methods of organizing health promotion and education and counselling activities at individual family and community settings	Dr. Trupti
3.	19.11.21	8 AM- 9 AM	CM 4.1 Describe various methods of health education with their advantages and limitations	Dr. Sudhir
4.	19.11.21	9 AM- 10 AM	CM 4.3 Demonstrate and describe the steps in evaluation of health promotion and education program	Dr. Samir
5.	26.11.21	8 AM- 9 AM	CM 5.1 Describe the common sources of various nutrients and special nutritional requirements according to age, sex, activity, physiological conditions	Dr Trupti
6.	26.11.21	9 AM- 10 AM	CM 5.3 Describe and demonstrate the correct method of performing a nutritional assessment of individuals, families and the community by using the appropriate method	Dr. Sudharsan

Theory schedule, December - 2021

Batch – 2018-19

(Wednesday- Monday)

S. No	Date	Time	Topic	Faculty
1.	01.12.2021	8am-9am	Nutritional problems in India	Dr. Trupti
2.	06.12.2021	1pm-4pm	Internal Assessment Exam II	Dr. Trupti, Dr. Sriandaal & Dr. Dinesh
3.	08.12.2021	8am-9am	Protein Energy Malnutrition I	Dr. Samir
4.	13.12.2021	3pm-4pm	Food additives & food adulterants	Dr. Munish

5.	15.12.2021	8am-9am	Protein Energy Malnutrition II	Dr. Samir
6.	20.12.2021	1pm-4pm	Internal Assessment Exam III	Dr. Sudhir, Dr. Sudharsan, Dr. Balakumaran
7.	22.12.2021	8am-9am	Methods of diet survey	Dr. Trupti
8.	27.12.2021	3pm-4pm	Community Nutrition Program	Dr. Sudharsan
9.	29.12.2021	8am-9am	Food safety and standards act	Dr. Sriandaal

Theory classes Schedule, December 2021
Batch – 2019-20 Day: Tuesday

S. No	Date	Topic	Time	Faculty Name
1.	07.12.2021	Plague (Lecture)	09.00 am to 10.00 am	Dr. Sriandaal
2.	14.12.2021	Internal assessment I	08.00 am to 11.00 am	Dr. Sudhir, Dr. Sriandaal & Mr. Vijay
3.	21.12.2021	Human Salmonellosis & Rickettsial Zoonoses	09.00 am to 10.00 am	Dr. Sudharsan
4.	28.12.2021	Emerging & re-emerging diseases (Seminar)	09.00 am to 10.00 am	Dr. Samir

Theory schedule for January 2022
Second year (Batch 2019-20) Day: Tuesday

S.N	Date	Time	Topic	Faculty Name
1	04-01-22	9-10am	Tetanus	Dr. Sriandaal
2	11-01-22	9-10am	Leprosy	Dr. Trupti
3	18-01-22	9-10am	STD	Dr. Sudhir
4	25-01-22	9-10am	AIDS	Dr. Sudhir

Theory schedule for January 2022
(Day: Monday -Wednesday)

Third year (Batch: 2018-19)

S.N	Date	Time	Topic	Faculty Name
1.	03-01-22	3-4 PM	Blindness	Dr. Munish
2.	05-01-22	8-9 AM	Community Nutrition Program	Dr. Sudharsan
3.	10-01-22	1-4 PM	Internal Assessment III	Dr. Trupti Dr. Mareeswaran Mr. Vijay
4.	12-01-22	8-9 AM	Food safety and standard act	Dr. Mareeswaran
5.	17-01-22	3-4 PM	Public Health Ethics I	Dr. Samir
6.	19-01-22	8-9 AM	RHD	Dr. Trupti
7.	22-01-22	2-4 PM	Cancer (Seminar)	Dr. Mareeswaran
8.	24-01-22	3-4 PM	Public Health Ethics II	Dr. Samir
9.	31-01-22	1-4 PM	Internal Assessment IV	Dr. Sudhir Dr. Sudharsan Dr. Sriandaal

Clinical posting schedule *for January 2022*

Batch – 2018-19 Batch: A Time: 9:00 a.m. – 1:00 p.m

S. No	Date	9 am-11 am	11-01 pm
54.	03.01.2022	Family & Diet Survey Dr. Sriandaal	
55.	04.01.2022	Excellence Laboratory Dr. Sudhir	
56.	05.01.2022	Malaria & Filaria exercise Dr. Samir	Statistical exercise Mr. Vijay
57.	06.01.2022	Screening & Tuberculosis exercise Dr. Sudhir	Statistical exercise Mr. Vijay
58.	07.01.2022	Extension Activity Dr. Trupti	
59.	10.01.2022	Morbidity & Mortality exercise (9-10.30am) Dr. Trupti	Statistical exercise (10.30am-12pm) Mr. Vijay
60.	11.01.2022	All Entomology Slides / Spotter revision Dr.Trupti	
61.	12.01.2022	OSPE(1-17) Dr. Sudharsan	OSPE(18-35) Dr.Sriandaal
62.	13.01.2022	OSPE revision (36-55) Dr.Sudhir	OSPE revision (56 onwards) Dr.Sriandaal

Theory schedule for January & February 2022
Second year(Batch 2019-20) Day: Tuesday

S.N	Date	Time	Topic	Faculty Name
1	04-01-22	9-10am	Tetanus	Dr. Sriandaal
2	25-01-22	9-10am	Leprosy	Dr. Trupti
3	15-02-22	9-10am	STD	Dr. Sudhir
4	22-02-22	9-10am	AIDS	Dr. Sudhir

THEORY CLASSES SCHEDULE, APRIL 2022
BATCH – 2020-21(THURSDAY) TIME: 12 Noon TO 1 PM

S.No	Date	Topic	Faculty Name
1.	21.04.2022	CM 5.1 Describe the common sources of various nutrients and special nutritional requirements according to age, sex, activity, physiological conditions	Dr. Sriandaal
2.	28.04.2022	CM 5.3 Define and describe common nutrition related health disorders (PEM)	Dr. Sudharsan

CLINICAL POSTING SCHEDULE, APRIL 2022
BATCH – 2019-20(Batch: D)

S.No	Date	9am-11am	11am-12pm
1.	04.04.2022	Screening&Epidemic investigation Dr. Trupti	Statistics Mr. Vijay Anto
2.	05.04.2022	Morbidity Statistics&Mortality Statistics Dr. Sriandaal	Statistics Mr. Vijay Anto
3.	06.04.2022	Demography & Vaccine requirement Dr. Trupti	Statistics Mr. Vijay Anto
4.	07.04.2022	Family health survey Dr. Samir	
5.	08.04.2022	Measures of association Dr. Samir	Statistics Mr. Vijay Anto
6.	09.04.2022	OSPE (01-20) Dr. Sriandaal	Malaria, Filariasis & TB exercises Dr. Samir
7.	11.04.2022	CSC (CHD) Dr. Trupti	StatisticsMr. Vijay Anto
8.	18.04.2022	CSC (Hypertension)Dr. Samir	StatisticsMr. Vijay Anto

9.	19.04.2022	StatisticsMr. Vijay Anto	CSC(Diabetes)Dr. Trupti
10.	20.04.2022	CSC (Tuberculosis)Dr. Sudhir	StatisticsMr. Vijay Anto
11.	21.04.2022	OSPE 1-10Dr. Sudharsan	CSC (ANC)Dr. Vasumathi
12.	22.04.2022	CSC (PNC)Dr. Sriandal	StatisticsMr. Vijay Anto
13.	23.04.2022	CSC (Adolescent case)Dr. Trupti	StatisticsMr. Vijay Anto
14.	25.04.2022	StatisticsMr. Vijay Anto	CSC (ARI)Dr. Sudharsan
15.	26.04.2022	CSC(ADD)Dr. Sudhir	OSPE21-30Dr. Vasumathi
16.	27.04.2022	CSC (Under five child)Dr. Sudharsan	OSPE 31-40Dr. Vasumathi
17.	28.04.2022	9-10.30 am OSPE 41-60 Dr. Vasumathi	10.30am-12pm OSPE 61-78 Dr. Sudhir
18.	29.04.2022	End posting exam (OSPE, Spotter, Epi & stat)	All faculty
19.	30.04.2022	End posting exam (CSC)	All faculty

PRACTICAL SCHEDULE, APRIL 2022
BATCH – 2019-20(TIME: 2PM TO 4 PM)

S.No	Date	BATCH	Topic	Faculty Name
1.	04.04.2022	**A**	CM1.9 Demonstrate the role of effective communication skills in health in simulated environment	Dr. Trupti
2.	05.04.2022	**B**		
3.	06.04.2022	**C**		
4.	11.04.2022	**A**	CM1.10 Demonstrate the important aspects of the doctor patient relationship in a simulated environment	Dr. Trupti
5.	12.04.2022	**B**		
6.	13.04.2022	**C**		
7.	18.04.2022	**A**	CM2.1 Describe the steps and perform clinic socio cultural and demographic assessment of the individual, family and community. (Identity & describe)	Dr. Sudhir
8.	19.04.2022	**B**		
9.	20.04.2022	**C**		
10.	25.04.2022	**A**	CM2.1 Describe the steps and perform clinic socio cultural and demographic assessment of the individual, family and community. (Demonstrate)	Dr. Sudharsan
11.	26.04.2022	**B**		
12.	27.04.2022	**C**		

ACADEMIC SCHEDULE, APRIL 2022
BATCH – 2021-22 (SATURDAY)

S.No	Date	Time	Topic	Faculty Name
1.	02.04.2022	10am- 11am 11.15am-3pm	Introduction & orientation to subject Introduction to institution, campus/Facilities	Dr. Trupti Dr. Sudharsan Dr. Vasumathi Mr. Vijay Dr.Balakumaran Dr. Dinesh
2.	09.04.2022	10am-1pm	Rational & guideline of FAP Orientation to Family Health Survey questionnaire	Dr. Vasumathi Dr. Sudhir
3.	23.04.2022	8 AM to 1 PM	Family Adoption Program (visit)	Dr. Sudharsan Dr. Sriandaal Dr. Vasumathi Dr. Dinesh Dr. Balakumaran Dr. Thendral
4.	30.04.2022	8 AM to 1 PM	Family Adoption Program (visit)	Dr. Sudharsan Dr. Sriandaal Dr. Vasumathi Dr. Dinesh Dr. Balakumaran Dr. Thendral

FAMILY ADOPTION PROGRAM SCHEDULE, MAY 2022
BATCH – 2021-22 (SATURDAY) (1YEAR MBBS)

S.No	Date	Time	Topic	Faculty Name
1.	07.05.2022	8 AM to 1 PM	Family Adoption program	Dr. Sudharsan Dr. Sriandaal Dr. Vasumathi Dr. Balakumaran Dr. Dinesh Dr. Thendral
2.	14.05.2022	8 AM to 1 PM	2nd Saturday	
3.	21.05.2022	8 AM to 1 PM	Family Adoption program	Dr. Sudharsan Dr. Sriandaal Dr. Vasumathi

				Dr. Balakumaran Dr. Dinesh Dr. Thendral
4.	28.05.2022	8 AM to 1 PM	Family Adoption program	Dr. Sudharsan Dr. Sriandaal Dr. Vasumathi Dr. Balakumaran Dr. Dinesh Dr. Thendral

THEORY CLASSES SCHEDULE, MAY 2022
BATCH – 2020-21 (THURSDAY) 2nd YEAR MBBS

S.No	Date	Time	Topic	Faculty Name
1	05.05.2022	12 to 1 PM	CM 7.1 Define Epidemiology and describe and enumerate the principles, concepts and uses (measurement)	Dr. Sudharsan
2	12.05.2022	12 to 1 PM	CM 7.1 Define Epidemiology and describe and enumerate the principles, concepts and uses (methods: Descriptive)	Dr. Vasumathi
3	19.05.2022	12 to 1 PM	CM 7.1 Define Epidemiology and describe and enumerate the principles, concepts and uses (methods: Case control study)	Dr. Trupti
4	26.05.2022	12 to 1 PM	CM 7.1 Define Epidemiology and describe and enumerate the principles, concepts and uses (methods: Cohort)	Dr. Sudhir

CLINICAL POSTING SCHEDULE, MAY 2022
BATCH – 2020-21 (Batch: D) 2YEAR MBBS

S.No	Date	9 AM – 11 AM	11 AM -12 PM
1.	02.05.2022	Basics of biostatistics and data entry – Mr Vijay Anto	Orientation to family health survey & diet survey- Dr. Sudhir
2.	04.05.2022	Family Health Survey I - Dr Sriandaal	
3.	05.05.202	Family Health Survey II - Dr Vasumathi	

	2		
4.	06.05.2022	Diet survey I – Dr Sudharsan	
5.	09.05.2022	Diet survey II – Dr Sriandaal	
6.	10.05.2022	Visit – PHC, Sub centre, Anganwadi - Dr Sudhir	
7.	11.05.2022	Visit – Regional vaccine store - Dr Sriandaal	
8.	12.05.2022	Visit - Solid waste management - Dr Sriandaal	
9.	13.05.2022	Visit - Water treatment plant –Manaloor - Dr Vasumathi	
10	16.05.2022	Visit – Sewage treatment plant - Dr Sudhir	
11	17.05.2022	Visit – AAVIN - Dr Sudhir	
12	18.05.2022	Visit - Excellence laboratory - Dr Sudharsan	
13	19.05.2022	Introduction to vaccines –Dr Samir	BCG, OPV & Rota virus - Dr Sudhir
14	20.05.2022	Vaccines - Rabies, Td & Typhoid - Dr.Sudhir	Vaccines – MMR, Measles, Vit.A , AD & Tuberculin syringe - Dr.Vasumathi
15	23.05.2022	Aedes – Egg, Pupa, larva & adult (Models + Slides) - Dr.Trupti	Culex – Egg, Pupa, larva & adult (Models + Slides) - Dr.Sudharsan
16	24.05.2022	Lice, Fleas, Cockroaches Dr. Sudhir	Ticks, mites, Bug & Leishmaniasis (Slide + model) - Dr Trupti
17	25.05.2022	Sanitary & insanitary well, Step well & Horrock's apparatus Dr Samir	Slow sand filter, Rapid sand filter & Chloroscope Dr Sudhir
18	26.05.2022	Deep trench latrine, Septic tank, Bore hole latrine Bio gas plant and Oxidation pond - Dr Trupti	House drainage system, Modern sewage treatment plant, Activated sludge process - Dr Vasumathi
19	27.05.2022	Bleaching powder, Disinfectants, Savlon & Rain water harvesting Dr Vasumathi	Pasteur Chamberland filter, Berkfeld filter, still for distilled water, & water hardness kit- Dr Sriandaal
20	30.05.2022	FHS report presentation Dr Samir & Mr Vijay	Insecticides, Mosquito repellants & Rodenticides - Dr Sriandaal
21	31.05.2022	Record submission & End posting examination - All faculty	

THEORY CLASSES SCHEDULE, MAY 2022

BATCH – 2019-20 (TUESDAY) 3 YEAR MBBS TIME: 8 AM TO 9AM

S.No	Date	Topic	Faculty Name
1.	10.05.2022	CM5.8 Describe and discuss the importance and methods of food fortification and effects of additives and adulteration	Dr Sriandaal
2.	17.05.2022	CM8.2 Epidemiological and control measures including the use of essential laboratory tests at the primary care level for diabetes.	Dr Sudharsan
3.	24.05.2022	CM8.2 Epidemiological and control measures including the use of essential laboratory tests at the primary care level for Hypertension	Dr Samir
4.	31.05.2022	CM8.2 Epidemiological and control measures including the use of essential laboratory tests at the primary care level for obesity	Dr Trupti

CLINICAL POSTING SCHEDULE, MAY 2022

BATCH – 2019-20(Batch: C) 3rd YEAR MBBS

S.No	Date	9 AM -11 AM	11 AM – 12 PM
1.	02.05.2022	Morbidity & Mortality Statistics - Dr Sriandaal	Statistics Mr. Vijay Anto
2.	04.05.2022	Screening & Epidemic investigation - Dr Sudharsan	Statistics Mr. Vijay Anto
3.	05.05.2022	Demography & Vaccine requirement – Dr Sudhir	Statistics Mr. Vijay Anto
4.	06.05.2022	Measures of association Dr Vasumathi	Statistics Mr. Vijay Anto
5.	07.05.2022	Malaria, Filariasis & TB exercises - Dr Sudhir	Statistics Mr. Vijay Anto
6.	09.05.2022	OSPE 1-10 Dr Sudhir	Statistics Mr. Vijay Anto
7.	10.05.2022	OSPE 11-20 Dr Vasumathi	Statistics Mr. Vijay Anto
8.	11.05.2022	OSPE21-30 Dr Sudharsan	Statistics Mr. Vijay Anto
9.	12.05.2022	OSPE 31-40 Dr Vasumathi	Statistics Mr. Vijay Anto
10.	13.05.2022	OSPE 41-55 Dr Sriandaal	OSPE 55 – 68 Dr Trupti
11.	16.05.2022	CSC – ANC Dr Sriandaal	Entomology Spotter Dr Vasumathi

12.	17.05.2022	CSC – CKD Dr Trupti	Nutritional Spotter Dr Sriandaal
13.	18.05.2022	CSC – HT Dr Sudhir	Environmental Spotter Dr Vasumathi
14.	19.05.2022	CSC – CVD Dr Sudharsan	Public health & programmee Spotters Dr Vasumathi
15.	20.05.2022	CSC – Diabetic foot Dr Samir	Statistics Mr. Vijay Anto
16.	21.05.2022	CSC – Adolescent Dr Trupti	Statistics Mr. Vijay Anto
		9 AM – 10.30 AM	**10.30 AM – 12 PM**
17.	23.05.2022	CSC – Diabetes Dr Samir	CSC – Tuberculosis Dr Sudhir
18.	24.05.2022	CSC – PNC Dr Sudharsan	CSC - ANC Dr Vasumathi
19.	25.05.2022	CSC – ADD Dr Trupti	CSC – Dengue/ PUO Dr Vasumathi
20.	26.05.2022	CSC – ARI Dr Samir	CSC – PNC Dr Sriandaal
21.	27.05.2022	CSC – under 5 Dr Sudhir	CSC – HT Dr Sudharsan
22.	28.05.2022	End posting exam (OSPE, Spotter, Epi & stat) - All faculty	
23.	30.05.2022	End posting exam (CSC) - All faculty	
24.	31.05.2022	Record / Logbook correction - All faculty	

THEORY CLASSES SCHEDULE, JUNE 2022
BATCH – 2020-21 (THURSDAY) 2nd YEAR MBBS

S.No	Date	Time	Topic	Faculty Name
1.	02.09.2022	9 to 10 AM	CM 7.5 Enumerate, define, describe and discuss epidemiological study Designs (Cohort)	Dr. Sudhir (Dr.trupti)
2.	09.06.2022	9 to 10 AM	CM 7.5 Enumerate, define, describe and discuss epidemiological study Designs (RCT & non RT)	Dr. Samir
3.	16.06.2022	9 to 10 AM	CM7.8 Describe the principles of association, causation, and biases in epidemiological studies	Dr. Munish(Dr.sudhir)
4.	23.06.2022	9 to 10 AM	**Practical & viva examination**	
5.	30.06.2022	9 to 10 AM	CM7.2 Enumerate, describe and discuss the modes of transmission and measures for prevention and control of communicable and non-communicable diseases	Dr. Sudharsan

CLINICAL POSTING SCHEDULE, JUNE 2022
BATCH – 2020-21 (Batch: C) 2YEAR MBBS

S.No	Date	10 AM – 11.30 AM	11.30 AM -1 PM
1.	01/6/2022	Introduction to Bio-stat : Mr. Vijay	Orientation to FHS & DS: Dr. Trupti
2.	02/6/2022	Family Health Survey I Dr. Sudharsan	
3.	03/6/2022	Family Health Survey II Dr. Sriandaal	
4.	06/6/2022	Diet Survey I Dr. Vasumathi	
5.	07/6/2022	Diet Survey II Dr. Sudharsan	
6.	08/6/2022	Water Treatment Plant Dr. Vasumathi	
7.	09/6/2022	Solid Waste management Plant Dr. Sriandaal	
8.	10/6/2022	Sewage Treatment Plant Dr. Sudharsan	
9.	13/6/2022	Visit to PHC Dr. Sriandaal	
10.	14/6/2022	Visit to Sub-centre and Anganwadi centre Dr. Vasumathi	
11.	15/6/2022	Visit to Excellence Laboratory Dr. Sudharsan	
12.	16/6/2022	Introduction to vaccine Dr. Samir	BCG, Hepatitis B, OPV and IPV Dr. Sudhir
13.	17/6/2022	DPT, Td, Pentavalent vaccine & PCV Dr. Samir	Rotavirus MMR, and Measles Dr. Vasumathi
14.	20/6/2022	Rabies, Typhoid and JE Dr. Sriandaal	Vitamin A, AD & Tuberculinsyringe Dr. Dinesh
15.	21/6/2022	Entomology: Culex Dr. Dinesh	Entomology: Remaining slides Dr. Sudharsan
16.	22/6/2022	Entomology: Aedes Dr. Balakumaran	Entomology: Anopheles Dr. Dinesh
17.	30/6/2022	Record Book valuation & End Posting Examination Dr. Vasumathi and Mr. Vijay	

THEORY CLASSES SCHEDULE, JUNE 2022

BATCH – 2019-20 (TUESDAY) 3 YEAR MBBS TIME: 8 AM TO 9AM

S.No	Date	Topic	Faculty Name
1.	07.06.2022	CM8.2 Describe and discuss the epidemiological and control measures including the use of essential laboratory tests at the primary care level for non-Communicable diseases (obesity)	Dr. Trupti
2.	14.06.2022	CM8.2 Describe and discuss the epidemiological and control measures including the use of essential laboratory tests at the primary care level for Non-Communicable diseases (Stroke)	Dr. Vas umathi
3.	21.06.2022	CM8.2 Describe and discuss the epidemiological and control measures including the use of essential laboratory tests at the primary care level for non-Communicable diseases (cancer)	Dr. Sriandaal
4.	28.06.2022	CM8.3 Enumerate and describe disease specific National Health Programs including their prevention and treatment of a case (NPCDCS)	Dr. Samir

CLINICAL POSTING SCHEDULE, JUNE 2022

BATCH – 2019-20(Batch: B) 3rd YEAR MBBS

S.No	Date	10am-11.30 am	11.30 am-1pm
20.	1/6/2022	Morbidity Exercise Dr. Sudhir	Statistics Mr. Vijay Anto
21.	2/6/2022	Mortality Exercise Dr. Sriandaal	Statistics Mr. Vijay Anto
22.	3/6/2022	Statistics Mr. Vijay Anto	Screening Exercise Dr. Samir
23.	4/6/2022	Statistics Mr. Vijay Anto	Epidemic investigation Dr. Trupti
24.	6/6/2022	Demography Exercise Dr. Trupti	OSPE 51-60 Dr. Sriandaal
25.	7/6/2022	Vaccine requirement Exercise Dr. Sudhir	StatisticsMr. Vijay Anto
26.	8/6/2022	Statistics Mr. Vijay Anto	Measures of association Exercise Dr. Trupti

27.	9/6/2022	Statistics Mr. Vijay Anto	Malaria, Filariasis & TB Exercises Dr. Samir
28.	10/6/2022	CSC (CHD) Dr. Trupti	Statistics Mr. Vijay Anto
29.	11/6/2022	CSC (Hypertension) Dr. Sudhir	Statistics Mr. Vijay Anto
30.	13/6/2022	Statistics Mr. Vijay Anto	CSC(Diabetes) Dr. Samir
31.	14/6/2022	CSC (Tuberculosis) Dr. Sudharsan	OSPE 1-10 Dr. Sudhir
32.	15/6/2022	CSC (ANC) Dr. Sriandaal	OSPE 11-20 Dr. Vasumathi
33.	16/6/2022	CSC (PNC) Dr. Vasumathi	OSPE 21-30 Dr. Samir
34.	17/6/2022	OSPE 31-40 Dr. Sudhir	CSC (Adolescent case) Dr. Samir
35.	18/6/2022	CSC (ARI) - Dr. Sudhir	OSPE 41-50 Dr. Vasumathi
36.	20/6/2022	CSC(ADD)- Dr. Trupti	Statistics Mr. Vijay Anto
37.	21/6/2022	CSC (Under five child) Dr. Sudharsan	OSPE 61-70 Dr. Vasumathi
38.	22/6/2022	Spotter revision: MCH Dr. Sudharsan	OSPE Revision Dr.Vasumathi
39.	23/6/2022	Statistics Mr. Vilay Anto	PBL Hypertension (session 1) Dr. Trupti & PGs
40.	24/6/2022	Statistics Mr. Vilay Anto	Spotter revision Nutrition Dr.Sudharsan
41.	25/6/2022	Spotter revision: Environment Dr. Dinesh	Spotter revision Occupational safety & health Dr. Balakumaraan
42.	27/6/2022	Spotter revision Public Health Lab Dr. Dinesh	Spotter: Medical Entomology Dr. Balakumaran
43.	28/6/2022	PBL Hypertension (session 2) Dr. Trupti & PGs	
44.	29/6/2022	End posting exam (CSC)	All faculty
45.	30/6/2022	End posting exam (OSPE, Spotter, Epi & stat)	All faculty

PRACTICAL SCHEDULE, JUNE 2022

BATCH – 2019-20 3 YEAR MBBS (TIME: 2PM TO 4 PM)

S.No	Date	BATCH	Topic	Faculty Name
1.	6/6/2022	**A**	CM3.3 Describe the aetiology and basis of water borne diseases/jaundice/hepatitis/diarrheal diseases (Epidemiology)	Dr. Sriandaal
2.	7/6/2022	**B**		
3.	8/6/2022	**C**		
4.	13/6/2022	**A**	CM3.3 Describe the aetiology and basis of water borne diseases/jaundice/hepatitis/diarrheal diseases (Prevention & treatment)	Dr. Trupti
5.	14/6/2022	**B**		
6.	15/6/2022	**C**		
7.	20/6/2022	**A**	CM3.7 Identify and describe the identifying features and lifecycles of vectors of public health importance and their control measures (Fleas & cockroaches)	Dr. Sudhir
8.	21/6/2022	**B**		
9.	22/6/2022	**C**		
10.	27/6/2022	**A**	CM3.7 Identify and describe the identifying features and lifecycles of vectors of public health importance and their control measures (Mosquito)	Dr. Sriandaal
11.	28/6/2022	**B**		
12.	29/6/2022	**C**		

THEORY CLASSES SCHEDULE, JUNE 2022

BATCH – 2018-19 3 YEAR MBBS (Additional Batch) TIME: 8 AM TO 9AM

S.No	Date	Topic	Faculty Name
1.	09.06.2022	Antenatal care	Dr. Sudhir
2.	10.06.2022	Intra-natal, postnatal care& neonatal care	Dr.Sudharsan
3.	16.06.2022	Low birth weight	Dr.Munish
4.	17.06.2022	Feeding of the infants and Growth & development	Dr. Sudhir
5.	23.06.2022	Care of the preschool child & child health problems	Dr. Dinesh
6.	24.06.2022	Maternal mortality ratio	Dr.Balakumaran
7.	30.06.2022	Mortality in infancy & childhood (PMR)	Dr. Dinesh

THEORY CLASSES SCHEDULE, July 2022

BATCH: 2021-22 (SATURDAY) 1nd YEAR MBBS Time: 10am To 11am

S.N	Date	Topic	Faculty Name
1.	02.07.2022	CM 1.6 Describe and discuss the concepts, theprinciples of Health promotion and Education, IEC and Behaviouralchange communication (BCC)	Dr. Trupti (Lecture)
2.	09.07.2022	**2nd SATURDAY**	
3.	16.07.2022	CM 1.7 Enumerate and describe healthindicators	Dr. Sudhir (Lecture)
4.	23.07.2022	CM 1.8 Describe the Demographic profile of India and discuss its impact onhealth	Dr.Sriandaal(Lecture)
5.	30.07.2022	CM 2.4Describe social psychology, communitybehaviour and community relationship and their impact on health and disease	Dr.Sudharsan(Lecture)

CLINICAL POSTING SCHEDULE, JULY 2022

BATCH: 2020-21 (Batch: B) 2YEAR MBBS

S.No	Date	10 AM – 11.30 AM	11.30 AM -1 PM
1.	01/7/2022	Introduction to Biostatistics Mr. Vijay	Orientation FHS & Diet survey Dr. Trupti
2.	04/07/2022	Family health survey I: Dr. Sriandaal	
3.	05/07/2022	Family health survey II : Dr. Sudharsan	
4.	06/7/2022	Diet Survey I : Dr. Vasumathi	
5.	07/7/2022	Diet Survey II: Dr. Sudharsan	
6.	08/7/2022	Water Treatment Plant : Dr. Sriandaal	
7.	11/07/2022	Solid Waste Management Plant : Dr. Vasumathi	
8.	12/07/2022	Sewage Treatment Plant: Dr. Vasumathi	
9.	13/7/2022	Visit to PHC, Subcenter & Anganwadi: Dr. Sriandaal	

10.	14/7/2022	Visit regional vaccine store: Dr .Sriandaal	
11.	15/7/2022	Visit To Excellence Laboratory: Dr. Sudharsan	
12.	18/07/2022	Introduction to vaccineDPT & Td: Dr. Dinesh	BCG, Hepatitis B & OPVDr.Dinesh
13.	19/07/2022	Pentavalent vaccine, MMR & Measles: Dr.Vasumathi	Rabies, Typhoid & JE: Dr. Samir
14.	20/7/2022	Vitamin A, AD & Tuberculinsyringe: Dr. Turpti	IPV, Rotavirus & Pneumococcalvaccine: Dr. Dinesh
15.	21/7/2022	Classification of contraceptives Barrier contraceptive method: Dr.Sriandaal	Oral Contraceptive pills: Dr. Sudhir
16.	22/7/2022	IUCD: Dr. Samir	ORS & Iron Folic acid tablet Dr.Balakumaran
17.	25/7/2022	Post-conception method: Dr.Dinesh	Vasectomy & tubectomy: Dr.Balakumaran
18.	26/07/2022	Entomology: Aedes: Dr.Sudharsan	Entomology: Culex: Dr. Dinesh
19.	27/7/2022	Entomology: Anopheles: Dr.Balakumaran	Entomology: other vectors:Dr. Dinesh
20.	28/7/2022	Spotter revision & FHS data presentationMr. Vijay, Dr.Balakumaran & Dr. Dinesh	
21.	29/7/2022	End posting exam	

THEORY CLASSES SCHEDULE, JULY 2022

BATCH: 2019-20 (TUESDAY) **3 YEAR MBBS** **TIME: 8 AM TO 9AM**

S.N	Date	Topic	Faculty Name
1.	05.07.2022	CM9.1 Define and describe the principles ofDemography, Demographic cycle, Vital statistics	Dr. Trupti (Flipped classroom)
2.	12.07.2022	CM9.4 Enumerate and describe the causes andconsequences of population explosion and population dynamics of India.	Dr. Sudharsan (Debate)

3.	19.07.2022	CM9.5 Describe the methods of populationcontrol (Barrier & IUCD)	Dr.Sriandaal (PechaKucha)
4.	26.07.2022	CM9.5 Describe the methods of populationcontrol (OCP & other)	Dr. Samir (TBL)

CLINICAL POSTING SCHEDULE,
JULY 2022 BATCH : 2019-20(Batch: A)

3rd YEAR MBBS

S.N	Date	10 AM – 11.30 AM	11.30 AM -1 PM
1.	01/7/2022	Morbidity exercises : Dr. Sudhir	Statistics Mr. Vijay
2.	02/07/22	Mortality exercises : Dr. Samir	Statistics Mr. Vijay
3.	04/07/22	Screening exercises : Dr. Dinesh	Statistics Mr. Vijay
4.	05/07/22	Epidemic investigation exercises :Dr. Trupti	Statistics Mr. Vijay
5.	06/7/2022	Demography exercises: Dr.Balakumaran	Statistics Mr. Vijay
6.	07/7/2022	Vaccine estimation exercises: Dr. Trupti	Statistics Mr. Vijay
7.	08/7/2022	Measures of association exercises :Dr. Sudhir	Statistics Mr. Vijay
8.	11/07/22	Malaria, Filariasis & TB exercises :Dr. Samir	Statistics Mr. Vijay
9.	12/07/22	CSC: CHD Dr.Sriandaal	Statistics Mr. Vijay
10.	13/7/2022	CSC: Diabetes Dr. Sudhir	Statistics Mr. Vijay
11.	14/7/2022	CSC: Hypertension Dr. Sudhir	OSPE 61-68 Dr.Vasumathi
12.	15/7/2022	CSC: ANC Dr. Trupti	OSPE 1-10 Dr. Sudhir
13.	16/7/2022	CSC: PNC Dr.Vasumathi	OSPE 11-20 Dr.Sriandaal
14.	18/07/22	CSC: Under 5 child Dr.Sudharsan	OSPE 21-30Dr. Trupti
15.	19/07/22	**Internal Assessment Examination**	
16.	20/7/2022	CSC: Adolescent girl Dr.Sriandaal	OSPE 31-40 Dr. Samir
17.	21/7/2022	CSC: ADD Dr. Samir	OSPE 41-50 Dr. Sudharsan
18.	22/7/2022	CSC: Tuberculosis Dr. Sudhir	OSPE 51-60 Dr.Samir
19.	23/7/2022	CSC: Geriatric case Dr.Sudharsan	Statistics Mr. Vijay
20.	25/7/2022	CSC: ARI Dr.Vasumathi	Spotter revision (MCH) Dr.Sriandaal
21.	26/07/22	Spotter revision (Nutrition)Dr.Vasumathi	Spotter revision (Occupation Health)Dr.Balakumaran
22.	27/7/2022	Spotter revision (Environment)	Spotter revision (Entomology&

		Dr.Sriandaal	public health lab)Dr.Sudharsan
23.	28/7/2022	Record Book Assessment : All Faculty	
24.	29/7/2022	End Posting Examination: All Faculty	
25.	30/7/2022	End Posting Examination: All Faculty	

PRACTICAL SCHEDULE, JULY 2022

BATCH = 2019-20 3 YEAR MBBS (TIME: 2PM TO 4 PM)

S.N	Date	BATCH	Topic	Faculty Name
1.	04/07/22	A	CM3.7 Identify and describe the identifying features and lifecycles of vectors of public health importance and their control measures (flies & lice)	Dr.Sudharsan (SGD-Jigsaw)
2.	05/07/22	B		
3.	06/7/2022	C		
4.	11/07/22	A	CM3.7 Identify and describe the identifying features and lifecycles of vectors of public health importance and their control measures (fleas, ticks & reduviid bug)	Dr.Vasumathi (SGD)
5.	12/07/22	B		
6.	13/7/2022	C		
7.	18/07/22	A	CM3.7 Identify and describe the identifying features and lifecycles of vectors of public health importance and their control measures (mite &Cyclops)	Dr.Sriandaal (SGD-TBL)
8.	19/07/22	B		
9.	20/7/2022	C		
10.	25/7/2022	A	CM4.3 Demonstrate and describe the steps in evaluation of health promotion and education program	Dr. Samir (SGD-Project)
11.	26/07/22	B		
12.	27/7/2022	C		

THEORY CLASSES SCHEDULE, JUNE 2022

BATCH: 2018-19 3 YEAR MBBS (Additional Batch) TIME: 8 AM TO 9AM

S.N	Date	Topic	Faculty Name
1.	07.07.2022	Neonatal mortality rate	Dr. Dinesh (Lecture)
2.	08.07.2022	Post-neonatal mortality rate	Dr. Balakumaran (Lecture)
3.	14.07.2022	Infant mortality rate	Dr. Munish (Lecture)
4.	15.07.2022	1-4 year mortality rate	Dr. Dinesh (Lecture)
5.	21.07.2022	Under 5 mortality rate	Dr. Balakumaran (Lecture)
6.	22.07.2022	Child mortality rate & child survival index	Dr. Srinadaal (SGD-Think pair share)
7.	28.07.2022	IMNCI	Dr. Sudhir (SGD-Think pair share)
8.	29.07.2022	School health service	Dr. Trupti (SGD-Think pair share)

TEACHING METHODOLOGIES

TEACHING LEARNING METHODS TO BE ADOPTED IN COMMUNITY MEDICINE

1. Lecture
2. Seminar
3. Symposium
4. Small Group discussion
5. Guest lectures
6. Project work
7. Team based learning
8. Problem based learning
9. Demonstration
10. Field visits
11. Industrial visits
12. Integrated teaching classes
13. Pecha kucha
14. Flipped class
15. Students quiz
16. Zig Zag

STUDY MATERIAL

Textbooks recommended –

Parks Textbook Of Preventive And Social Medicine, K.Park
Community Medicine With Recent Advances, AH Suryakantha
IAPSM textbook

Reference books

- Textbook Of Community Medicine, Rajvir Balwar
- Textbook Of Community Medicine, Piyush Gupta
- Methods In Bio Statistics By B.K.Mahajan
- Basic Concepts In Epidemiology – Beaglehole
- Government Of India Modules for Various National Health Programmes.
- Review Of Preventive & Social Medicine , Vivek Jain
- Conceptual Review Of Preventive And Social Medicine (PSM), Mukhmohit Singh
- Self Assessment & Review of Preventive Social Medicine 10th Ed 2018 ,Satish S. Mali & Arvind Arora
- Handbook Of Community Medicine , Subramanian /Mangala
- Principles Of Community Medicine , Rahim/Asma

Journals

- Indian Journal of Community Medicine (IJCM)
- Indian Journal of Community Health
- Journal Of Community Health Research
- International Journal of Preventive Medicine
- AIMS Public Health
- Journal of family and community medicine
- National Journal of Community Medicine
- International Journal of Community Medicine and Public Health
- International Journal of Family & Community Medicine - IJFCM

LIST OF MODELS, SPECIMENS, SLIDES, EQUIPMENT, CHARTS & PORTRAITS

SN	NAME	NUMBER
1.	Models	53
2.	Equipments	69
3.	Charts/ Diagram	87
4.	Spotter/Specimens	81
5.	Slides	5 sets
6.	Portraits	31

MODELS

1. Tubectomy
2. Vasectomy
3. Measles
4. Mumps
5. Chicken pox
6. House drainage system
7. Incinerator
8. Deep trench latrine
9. Septic tank
10. Berkefeld filter
11. Insanitary well
12. Sanitary well
13. Borehole latrine
14. Step well
15. Slow sand filter
16. Rapid sand filter
17. Modern sewage treatment plant (Activated sludge process)
18. Paster chamberland filter
19. Candle of Berkefeld filter
20. Smokeless chulha
21. Life history of culex
22. Life cycle of Aedes
23. Life cycle of Leishmaniasis
24. Life cycle of Malarial parasite
25. Potato
26. Brinjal green
27. Brinjal violet
28. Onion
29. Garlic
30. Baby corn
31. Lady finger
32. Tomato
33. Carrot
34. Bitter gourd
35. Cucumber
36. Snake gourd
37. Egg
38. Banana
39. Apple red
40. Grapes
41. Mango
42. Guava

43. Pomegranate
44. Pears
45. Orange
46. Mosambi
47. Green apple
48. Cashew fruit
49. White plum
50. Red plum
51. Strawberry
52. Papaya
53. Custard apple

List of equipments

SN	Name of items	Available
1.	Barometer (Mercury based instruments to be replaced with other alternatives)	1 (Mercury based barometer) 1 (aneroid barometer)
2.	Filter, BerkeFed	2
3.	Hydrometers, Spirit	3
4.	Hydrometers, milk (Lactometer)	3
5.	Hygrometers, wet and dry bulb	3
6.	Incubators, electric	1
7.	Museum jars	Yes
	Models, charts, diagrams, specimen	Models- 53 Charts – 28 Diagrams -56 Specimen – 81 Portrait- 31
8.	Balance analytical 200 gm.	3
9.	Balance for weighing food stuff (Capacity 2 kg)	3
10.	Centrifuge clinical	3
11.	Weighing Machine Adult	8
12.	Baby Weighing Machine	4
13.	Salters Baby Weighing Machine	4
14.	Harpender Calipers (for skin fold thickness)	4
15.	Height Measuring Stand	2
16.	Refrigerator 9 cu.ft.	3
17.	Ice lined refrigerator(I.L.R.) (at health centre)	1
18.	Dissecting Microscope	40
19.	Microscope oil immersion	3
20.	T.V. and DVD player	4
21.	Autoclave (can be shared with pathology/ Microbiology department)	2
22.	Computer with printer, scanner and photocopier and internet facility	7
23.	Vehicles for transport of students/ interns/ faculty/ paramedical staff to the RHTC and UHTC	Available
24.	Multimedia projector with screen	2
25.	Public address system	2
26.	Chloroscope	10
27.	Horrock’s apparatus	3
28.	MUAC tapes	10
29.	Haemoglobinometer	5
30.	BP apparatus (Digital)	10
31.	Stethoscope	11

32.	Kata Thermometer	3
33.	Globe Thermometer	3
34.	Anemometer	4
35.	Sound Level Meter	4
36.	Soil Testing Kit	1
37.	Water Sampling Bottle from any depth	1
38.	Needle Shredder	5
39.	Vaccine carrier	5
40.	Water Testing Kit	1
41.	Protective Devices for occupational safety	3
42.	Ear Muffs	3
43.	Ear Plugs	3
44.	Safety Helmet	3
45.	Goggles	3
46.	Safety Boots	3
47.	Swine Flu Kit	2
48.	Gloves	2
49.	Triple Layer Surgical Mask	1
50.	High Efficiency Mask	1
51.	Long Sleeved Cuffed Gown	1
52.	Protective Eye Wear	1
53.	Cap	1
54.	Disposable Delivery Kit	1
55.	Treatment Kits as per National Health Programmes	1
56.	Iodine Testing Kit	6
57.	Glucometer	10
58.	Slide set for Entomology	5
59.	Mosquito Catching Kit	4
60.	Clinical Thermometer	10
61.	Sling Psychrometer	3
62.	Solar Radiation Thermometer	3
63.	First Aid Kit	1
64.	Spirometer	2
65.	Audiometry	0
66.	Otoscope	1
67.	Ophthalmoscope	1
68.	Laptop	1
69.	Filter, Pasteur Chamberland, Complete set	1

EQUIPMENTS
(IN LABORATORY)

SN	Name of items	Available
1.	Barometer	2(mercury -1 + Aneroid -1)
2.	Hygrometers, wet and dry bulb	3
3.	Weighing Machine Adult	5
4.	Baby Weighing Machine	1
5.	Salter's weighing Scale	2
6.	Infantometer	1
7.	Height Measuring Stand	2
8.	Magnifying glass	2
9.	Refrigerator 9 cu.ft.	1
10.	Computer	1
11.	Multimedia projector with screen	2
12.	Dissecting microscope	40
13.	Compound(oil immersion) microscope	3
14.	Chloroscope	10
15.	Horrock's apparatus	3
16.	Berkfeld filter	2
17.	Haemoglobinometer	4
18.	BP apparatus (Digital)	8
19.	Stethoscope	3
20.	Needle Shredder	1
21.	Glucometer	7
22.	Slide set for Entomology	5
23.	Clinical Thermometer	7
24.	Otoscope	1
25.	Ophthalmoscope	1
26.	Laptop	1
27.	Distilled water(still)	1
28.	Water Hardness test kit	1
29.	Public address system	2

30.	Spirometer	1+1
31.	Sling Psychrometer	3
32.	Solar Radiation Thermometer	3
33.	MUAC tapes	10
34.	Anemometer	4
35.	Sound Level Meter	4
36.	Water Sampling Bottle from any depth	1
37.	Autoclave	1
38.	Incubator	1
39.	Centrifuge	1
40.	Multi Water Testing Kit	1
41.	Food weighing balance	2
42.	Harpender calipers	2
49.	Mosquito catching kit	3
50.	Soil testing kit	1
51.	Kata Thermometer	3
52.	Globe Thermometer	3

EQUIPMENTS (IN MUSEUM)

SN	NAME OF ITEMS	AVAILABLE
1	Hydrometres, Spirit	3
2	Hydrometres, milk (Lactometer)	4
3	Balance for weighing food stuff (capacity 2 kg)	1
4	Analytical balance	3
5	Harpender Calipers (for skin fold thickness)	2
6	Fat Extraction Apparatus	1
7	Ear muffs	3
8	Ear plugs	6
9	Safety helmet	3
10	Safety Goggles	3
11	Hand shield	1
12	Safety boots	3
13	Swine Flu Kit	2
14	High Efficiency Mask	1
15	Long Sleeved Cuffed Gown	1
16	Protective Eye Wear	1
17	Triple Layer Surgical Mask	1
18	Surgical Gloves	2
19	Surgical gown	1
20	Disposable Delivery Kit	1
21	Hospital safety kit	1
22	Treatment Kits (malaria, TB, leprosy)	3

23	Iodine Testing Kit	6
24	Mosquito Catching Kit	1
25	First Aid Kit	1
26	Infant weighing scale	1
27	Vaccine carrier	3

CHARTS/DIAGRAM

1. Understanding hepatitis
2. Leprosy
3. Dehydration
4. Balanced diet
5. Types of foot wear to be avoided
6. Sexually transmitted infections
7. Warning signs of breast cancer
8. Exclusive breastfeeding
9. Oral hygiene
10. Diarrhoea
11. Nerve trunks commonly affected in Leprosy
12. Ice berg of diseases
13. Reducing diets, weight maintenance Diets for adults
14. Comparative studies of Aedes, Anopheles and Culex
15. Height for weight
16. Food pyramid
17. Keys to healthy eating
18. Carriers by portal of exit
19. Marasmus
20. Save your child from six killer diseases
21. Malnutrition
22. Leprosy – NLEP (tamil)
23. RNTCP – grading of AFP smear
24. RNTCP – TB screening (tamil)
25. Poisoning
26. Hippocratic oath
27. Patient's charter for Tuberculosis-2 nos.
28. Leprosy self care-hands and feet
29. Life history of House fly
30. Life cycle of Aedes
31. Cyclops
32. Life history of Culex
33. Guinea worm life cycle
34. Leishmaniasis life cycle
35. Hook worm- life cycle
36. Tsetse fly
37. Malaria parasite – life cycle
38. Entamoeba histolytica- life cycle
39. Life cycle of Enterobius vermicularis

40. Life cycle of a louse
41. Rat flea
42. Sand fly
43. Life cycle of malaria parasite
44. Ticks
45. Malaria
46. Epidemiological triad
47. Bhopal gas tragedy
48. Sanitation barrier
49. Hospital waste disposal- colour coding
50. Green House Effect
51. Prevention of parent to child transmission – HIV
52. Traditional healthy Indian diet pyramid
53. Dynamics of disease transmission
54. Demographic cycle- transition
55. Prevalence of anemia among women in India
56. Violence against women: Global picture
57. Sex ratio
58. Composite bar diagram-rotavirus mortality in India
59. Relationship between birth order and childhood vaccination
60. Histogram
61. Self- reported-drinking
62. India- population – pyramid-2012
63. Epidemiology of pandemic H1N1 strains.
64. Simple bar diagram
65. Pictogram or Picture-diagram
66. Pie diagram
67. Line diagram-comparative female infant mortality rates.
68. Bell curve
69. Composite bar diagram-Neonatal indicators
70. Health effects of pollution.
71. Transmission of faecal borne diseases
72. Bio gas plant
73. Rain water harvesting
74. Oxidation pond.
75. Leprosy-disabilities in relation to peripheral nerves that are damaged
76. Balanced diets-Normal, pregnant and lactating women at low cost-2 nos.
77. Chicken pox
78. Japanese encephalitis
79. Dengue,chikungunya
80. tobacco free zone
81. Human Papilloma virus
82. Risk factors for uterine cancer
83. Lung cancer
84. The PPTCT Act, 1994-Powers of enforcement authorities.
85. The PPTCT Act, 1994-Rights of women
86. Registration of births/deaths
87. Story board- pictogram

SPECIMENS

1. Rodenticides
2. Bleaching powder
3. Savlon
4. Disinfectants
5. Mosquito Repellents
6. BHC
7. Malathion
8. Abate
9. Baytex (Fenthion)
10. Micro-cellular rubber footwear
11. Mala – D
12. Mala - N
13. Vitamin A solution
14. Iron tablets
15. Folic acid tablets
16. Oral rehydration salt
17. Sanitary napkin
18. Condom
19. Copper-T
20. Mother linked child health card
21. MDT-PB Leprosy
22. MDT-MB Leprosy
23. Anti-Tuberculosis drugs
24. BCG Syringe
25. Sputum collection container
26. Bengal gram
27. Black gram
28. Green gram
29. Towar dal
30. Masoor dal
31. Dry green peas
32. Soyabean
33. Weaning foods/ complementary feeding
34. **Hyderabad mix**
35. Ground nut
36. Wheat
37. Roasted bengal gram
38. Milk and milk products
39. Salt
40. Sugar
41. Margarine
42. Maida

43. Mustard seeds
44. Fats and oils
45. Iodized Salt
46. Par boiled rice
47. Modification of foods
48. Carbohydrates
49. Food Preservatives
50. Complementary weaning food
51. Milk
52. Egg
53. Jowar
54. Bajra
55. Ragi
56. Maize
57. Wheat
58. Rice
59. Safety helmet
60. Hand shield
61. Safety ear plug
62. Leather gloves
63. Apron
64. Boots
65. Respirator
66. Goggles
67. Oral polio vaccine
68. Measles vaccine
69. JE (SA 14-14-2) vaccine
70. DPT vaccine
71. Pentavalent vaccine
72. Vi polysaccharide Typhoid vaccine
73. Rabies vaccine
74. Tetanus toxoid vaccine
75. MMR vaccine
76. MR vaccine
77. Rota virus vaccine
78. Influenza vaccine
79. BCG vaccine
80. Vaccine carrier
81. Colour coded Bio medical waste bin – Red, Yellow, Blue

Portraits

1. Thomas Sydenham
2. James Lind
3. Sushruta
4. Edward Jenner
5. Paracelsus
6. John Snow
7. Sir Joseph William Bhore
8. Amartya sen
9. Albert Sabin
10. Pettenkofer of Munich
11. Johann Peter Frank
12. Alfred Grotjahn
13. Henry Dunant
14. Bernardino Ramazzini
15. David Morley
16. Typhoid Mary
17. Sri Dhanvantri
18. Hygiea
19. Charaka
20. Jonas Edward Salk
21. Galent
22. Armaeur Hansen
23. Fracastorious
24. Hippocrates
25. Louis pasteur
26. Sir Ronald Ross
27. Paul Muller
28. William Budd
29. Sir Edwin Chadwick
30. John D. Rockefeller
31. Robert Koch

INTERNAL ASSESSMENT QUESTION PAPER

VELAMMAL MEDICAL COLLEGE, HOSPITAL AND RESEARCH INSTITUTE

Department of Community Medicine

Internal assessment I Batch 2019-20 2nd year MBBS

Marks: 100 (80 Descriptive +20 MCQs) Date: 14-12-21

All questions are compulsory

LONG ANSWER QUESTIONS **2 ×15 = 30**

1. 53-year-old man from Rameswaram comes to medicine OPD of tertiary care hospital with complaints of episodic fever, chills, and muscle pain. On further evaluation patient described one week history of recurrent fever, chills, and malaise. He also had experienced episodic headaches as well as intermittent epigastric pain. Physical Examination: The patient appeared to be in no acute distress but was sweating profusely. His temperature was 102.5°F. No hepato-splenomegaly was identified. On investigation of blood smear, it shows malarial parasite positive.
   a. Explain the epidemiological determinants of above case. (5)
   b. Discuss the treatment of the given case considering it as an uncomplicated case. (5)
   c. Write a note on "The Global Technical Strategy for Malaria 2016-2030. (5)

2. Define Epidemiology. Classify Epidemiological studies. Discuss in detail about case control study. Write differences between case control and cohort studies. (1+2+7+5)

SHORT ANSWER QUESTIONS **10 × 5 = 50**

1. Niti Aayog
2. Control of Typhoid fever
3. Surveillance of drinking water quality
4. Prevention and control of air pollution
5. Disease eradication
6. Primary prevention
7. Types of screening
8. Epidemiological determinants of Zika virus disease
9. Rotavirus vaccine
10. Principles of biomedical ethics

MULTIPLE CHOICE QUESTIONS

1. Globe thermometer is used to measure
(a) Air Temperature (b) Cooling power of Air (c) Humidity (d) Mean Radiant Temperature
2. Bangalore method of Composting is a type of
(a) Aerobic method (b) Anaerobic method (c) both (d) none
3. The appropriate method of displaying the changes that occur in disease frequency over time
(a) Line chart (b) Bar chart (c) Histogram (d) Pictogram
4. The commonly occurring value in the distribution of data set is
(a) Mean (b) Mode (c) Median (d) All of the above

5. Screening differs from periodical health examinations in the following respect:
(a) capable of wide application (b) relatively inexpensive (c) requires little physician time
(d) all of the above

6. **Validity of the test is the consistent results it gives when repeated more than once on the same individual under the same condition.**
(a) True (b) False

7. The amount of previously unrecognized disease that is diagnosed as a result of the screening effort is
(a) Sensitivity (b) Yield (c) Specificity (d) Precision

8. Following food poisonings are due to preformed toxins except:
(a) Staphylococcal (b) Botulism (c) Salmonella (d) Bacillus cereus

9. Chronic carriers of typhoid are those who excrete the bacilli for more than _____ years.
(a) ten (b) three (c) one (d) five

10. What is the correct order of stages in a case of cholera (i) Stage of evacuation (ii) Stage of recovery (iii) stage of collapse
(a) iii, ii, i (b) ii, i, iii (c) i, iii, ii (d) None

11. HDI is a composite index comprising of the following dimensions except
a) Knowledge (b) Income (c) Occupation (d)Longevity

12. The following is true about Disability Adjusted Life Years [DALYs] except
a) It is best measure of burden of disease in a defined population
b) It also measures the effectiveness of interventions
c) DALYs cannot measure both mortality and disability together
d) One DALY is equal to one year of healthy life lost

13. Missing cases are detected by
(a) Active surveillance (b) Passive surveillance (c) Sentinel surveillance (d) Monitoring

14. Which of the following is primordial prevention?
(a) Action taken prior to the onset of disease
(b) Prevention of emergence of development of risk factors
(c) Action taken to remove the possibility that a disease will ever occur
(d) Action that halts the progress of a disease

15. Pap smear test for detection of carcinoma of cervix is which level of prevention?
(a) Primordial (b) Primary (c) Secondary (d) Tertiary

16. Long term fluctuation is seen with
(a) cyclic trends (b) epidemics (c) secular trends (d) seasonal trends

17. The duration of quarantine is:
(a) Longest incubation period (b) Shortest incubation period (c) Infective period (d) None of the above

18. In a randomized controlled trial, the essential purpose of randomization is:
(a) To produce double blinding (b) To decrease the follow- up period (c) To eliminate the selection bias (d) To decrease the sample size

19. Suspected cause preceding the observed effect is an example for:
(a) Coherence (b) Temporality (c) Biological plausibility (d) Specificity

20. The analytical study where population is the unit of study is:
(a) Cross-sectional (b) Ecological (c) Case-control (d) Cohort

VELAMMAL MEDICAL COLLEGE, HOSPITAL AND RESEARCH INSTITUTE

Department of Community Medicine

Internal assessment I Batch 2020-21 1st year MBBS

Marks: 100 (80 Descriptive +20 MCQs) Date: 23-12-21

All questions are compulsory

LONG ANSWER QUESTIONS **2 ×15 = 30**

1. Define health education? As a medical officer of the primary health centre, you have been asked to deliver health education to a group of school children, what are the various methods you will use in health communication? Discuss in brief the various principles of health education. (1+8+6).
2. What is safe and wholesome water? Discuss in detail the purification of water on a large scale. Add a note on water-born diseases. (2+10+3)

SHORT ANSWER QUESTIONS **10 × 5 = 50**

1. Regulatory appeoach (Managed prevention) to health education
2. Disability-adjusted life years (DALY)
3. The triangle of epidemiology
4. Iceberg of disease
5. Rehabilitation
6. Effects of noise exposure
7. Biological effects of radiation
8. RCA Latrine
9. Principles of arthropod control
10. Doctor patient relationship

MULTIPLE CHOICE QUESTIONS **1 × 20 = 20**

1. Scabies is transmitted by:
(a) Mite (b) Tick (c) Louse (d) Rat flea

2. The heart of activated sludge process is:
(a) Aeration tank (b) Primary sedimentation (c) Digestion tank (d) Secondary sedimentation tank

3. All of the following are methods of sewage disposal Except
(a) River outfall (b) Land treatment (c) Oxidation ponds (d) Bangalore method (Composting)

4. Human Development Index (HDI) does not include:
(a) Mean years of schooling (b) Life expectancy at age 1 (c) Real GDP per capita (d) Adult literacy rate

5. Which of the following is a Mortality Indicator?
(a) Life Expectancy (b) Notification Rate (c) DALY (d) Bed turn-over ratio

6. Disease elimination refers to:
(a) Extinction of disease agent (b) Termination of all disease (c) Global removal of disease agent (d) Regional removal of disease agent

7. Disability Limitation' is mode of intervention for:
(a) Primordial Prevention (b) Primary Prevention (c) Secondary Prevention (d) Tertiary Prevention

8. Pap smear test for detection of carcinoma of cervix is which level of prevention?
(a) Primordial (b) Primary (c) Secondary (d) Tertiary

9. Iceberg phenomenon differentiates:
(a) Apparent and Inapparent (b) Symptomatic and Asymptomatic (c) Cases and Carriers
(d) Diagnosed and Undiagnosed

10. Quarantine is isolation of healthy individual:
(a) For longest incubation period of disease (b) For shortest incubation period of disease
(c) For twice the incubation period of disease (d) For period of generation time

11. Ortho-toulidine test is used to determine:
(a) Nitrates in water (b) Nitrites in water (c) Free and combined chlorine in water (d) Ammonia content in water

12. Faecal contamination of drinking water is evaluated by:
(a) Klebsiella (b) E coli (c) Proteus (d) Coagulase negative staphylococci

13. Which of the following is not a source of Indoor Air Pollution?
(a) Carbon monoxide (b) Nitrogen dioxide (c) Radon (d) Mercury vapour

14. Which of the following is the correct sequence of various components of the 'communication process':
(a) Receiver, Message, Channel, Feedback, Sender
(b) Sender, Feedback, Message, Channel, Receiver
(c) Sender, Message, Channel, Receiver, Feedback
(d) Message, Sender, Channel, Feedback, Receiver

15. Which one is not a two way communication?
(a) Lecture (b) Workshop (c) Group discussion (d) Panel discussion

16. Which method is used for HIV postest counselling:
(a) Individual approach (b) Group approach (c) Mass media (d) All of the above

17. The function of grit chamber in modern sewage plants is:
(a) Formation of sludge (b) Removal of floating large objects (c) Settlement of heavy objects
(d) Formation of Zoogleal layer

18. Chikungunya is transmitted by:
(a) Aedes (b) Culex (c) Mansonoides (d) Anopheles

19. Paris Green is used to eliminate the larva of:
(a) Anopheline (b) Culex (c) Aedes (d) Mansonoides

20. Floor space : the accepted standards for one person is
(a) 110 sq.ft. (11 sq. m .) or more ..... (b) 90- 100 sq .ft. (9-10 sq. m.)
(c) 70- 90 sq.ft. (7-9 s q . m .) (d) 50-70 sq.ft. (5-7 sq. m.)

Velammal Medical College Hospital and Research Institute

Department of Community Medicine

Internal Assessment (19/07/2022)

Essay **2*10= 20**

1.Write the sources of air pollution? Describe the strategies regarding the preventing measures of air pollution in our country.

2. Write in detail the epidemiology, clinical features and control of Japanese encephalitis.

Write short noted **6*5= 30**

1. Types of ventilation.
2. Indices of thermal comfort.
3. Epidemiological determinants of leprosy.
4. Refuse disposal methods in rural areas.
5. Intensified Pulse Polio Immunization.
6. Management of cases and carriers in diphtheria.

Write brief notes **5*2=10**

1. Smoke index.
2. Zoogleal layer of slow sand filter
3. Blocked flea
4. Covishield vaccine
5. Manmade malaria

VELAMMAL MEDICAL COLLEGE, HOSPITAL AND RESEARCH INSTITUTE
Department of Community Medicine
Internal Assessment I Batch 2021-22 1st year MBBS
Marks: 100 (80 Descriptive +20 MCQs) Date: 29-08-2022
All questions are compulsory

LONG ANSWER QUESTIONS **2 ×15 = 30**

1. Define health indicators, enlist the various health indicators and state the characteristics. Discuss in detail the Health Index of India (1+2+2 +5).
2. Define family and state the types of families. What are the various functions of the family? Discuss in detail the role of family in health and disease (1+2+2+5)

SHORT ANSWER QUESTIONS **10 × 5 = 50**

1. Physical Quality of Life Index [PQLI]
2. The triangle of Epidemiology
3. Primordial Prevention
4. Wealth Index
5. International classification of diseases
6. Consumer Protection Act
7. Social Security
8. Global Hunger Index
9. Triage
10. Disaster Preparedness

MULTIPLE CHOICE QUESTIONS **1 × 20 = 20**

1. Human Development Index (HDI) does not include: (a) Mean years of schooling (b) Life expectancy at age 1 (c) Real GDP per capita (d) Adult literacy rate	2. Web of causation of disease, which statement is most appropriate? (a) Mostly applicable for common diseases (b) Requires complete understanding of all factors associated with causation of disease (c) Epidemiological ratio (d) Helps to suggest ways to interrupt the risk of transmission
3. Which of the following is best suited for the role of social worker? (a) Health professional involved in physiotherapy (b) Health professional involved in coping strategies, interpersonal skills, adjustment with family (c) A person involved in finding jobs and economic support for disabled (d) Health professional involved in treatment of patients	4. The term 'disease control' describes ongoing operations aimed at reducing the 1. Incidence of disease 2. Financial burden to the community 3. Effects of infection including both physical and psychological complications 4. Duration of disease and its transmission of these statements, (a) 1, 2 and 3 are correct (b) 1, 3 and 4 are correct (c) 1, 2 and 4 are correct (d) 1, 2, 3 and 4 are correct
5. Analysis of routine measurement is aimed at detecting changes in environment (a) Monitoring (b) Surveillance (c) Isolation (d) Evaluation	6. Pap smear test for detection of carcinoma of cervix is which level of prevention? (a) Primordial (b) Primary (c) Secondary (d) Tertiary

7. Desks provided with table top to prevent neck problems is an example of (a) Primordial prevention (b) Primary prevention (c) Specific protection (d) Disability limitation	8. Missing cases are detected by (a) Active surveillance (b) Passive surveillance (c) Sentinel surveillance (d) Monitoring
9. Social pathology is: (a) Change in disease pattern due to change in lifestyle (b) Study of social problems which cause disease in population (c) Conflicts arising from new opportunities in transitional societies (d) Study of human relationships and behaviour	10. Acculturation means: (a) Culture contact (b) Study of the various cultures (c) Cultural history of health and disease (d) None of the above
11. IQ = 51 is: (a) Mild MR (b) Moderate MR (c) Severe MR (d) Profound MR	12. All of the following are taken into consideration in Kuppuswamy scale except: (a) Education status (b) Occupational status (c) Living/housing conditions (d) Per capita income
13. In interview, first stage is to: (a) Establish contact (b) Starting interview (c) Establishing rapport (d) Probe questions	14. Which one of the following does not represent the submerged portion of the iceberg? (a) Diagnosed cases under treatment (b) Undiagnosed cases (c) Pre-symptomatic cases (d) Carriers sub clinical cases
15. Inner subjective thought of a person towards an individual or a situation is best described as: (a) Attitude (b) Value (c) Belief (d) Opinion	16. Which epidemic does not occur after a disaster? (a) L eptospirosis (b) Leishmania (c) ARTI (d) Rickettsia
17. During massive disaster what should be done first? (a) Search and rescue, first aid (b) Triage (c) Stabilization of victims (d) Hospital treatment and redistribution of patients to hospital if necessary	18. The gas responsible for Bhopal gas tragedy was: (a) Methyl isocyanate (b) Potassium isothiocyanate (c) Sodium isothiocyanate (d) Ethyl isothiocyanate
19. All vaccines are NOT given in disaster, except: (a) Cholera (b) Tetanus (c) Measles (d) JE	20. Which of the following is the nodal centre for disaster management? (a) PHC (b) CHC (c) Police Control room (d) District

VELAMMAL MEDICAL COLLEGE HOSPITAL AND RESEARCH INSTITUTE

Department of Community Medicine

Internal assessment III Batch 2019-20 3rd year MBBS

Marks: 100 (80 Descriptive +20 MCQs) Date: 15-09-2022

All questions are compulsory

LONG ANSWER QUESTIONS **2 ×15 = 30**

1. Enlist nutritional assessment methods. Describe their relationship to the natural history of disease. State the objectives of comprehensive nutritional survey and write in detail about any four nutritional assessment methods. (2+3+2+8).
2. Discuss epidemiological determinants of Diabetes. Describe secondary prevention for diabetes. Enumerate the objectives of National Program for Prevention & Control of Cancer, Diabetes, Cardiovascular disease & Stroke (NPCDCS) and discuss activities conducted related to this program at district hospital. (5+5+2+3)

SHORT ANSWER QUESTIONS **10 × 5 = 50**

1. Population strategy for prevention of Coronary Heart Disease
2. Screening for Breast Cancer
3. Epidemiology of Rheumatic Heart Disease
4. Risk factors for Road Traffic Accidents
5. Comprehensive eye health care
6. Epidemiological assessment of Iodine deficiency
7. Ecology of malnutrition
8. National Nutrition Policy 1993
9. Mission Parivar Vikas (MPV)
10. Third generation Intra-Uterine Devices

MULTIPLE CHOICE QUESTIONS **20 × 1 = 20**

1. According to the WHO, what is the cut-off for visual acuity for blindness? a. 6/60 b. 3/60 c. 1/60 d. Perception of light	2. The BMI of two Indian college students are 17 and 26 respectively. How will you classify them in terms of their BMI? a. Underweight and normal b. Underweight and overweight c. Normal and Overweight d. Underweight and obese
3. Which of the following is the most common cause of blindness in India? a. Refractive error b. Cataract c. Diabetic retinopathy d. Trachomatous corneal opacity	4. Which of the following interventions will cause the maximum decrease in systolic blood pressure in a hypertensive patient? a. Restricting intake of animal products b. Brisk walk for at least 30 minutes a day c. Adopting the DASH eating plan d. Restricting sodium intake < 6g per day
5. Which of the following statements is true regarding tracking of blood pressure? a. BP increases with age b. BP falls steadily in the elderly c. Hypertensive children become hypotensive as they grow d. BP of hypotensive children tends to remain low in adult life.	6. A patient's fasting plasma glucose is 130 mg/dl and postprandial plasma glucose is 138 mg/dl. According to the WHO diagnostic criteria for diabetes, which category does this patient fall under? a. Isolated postprandial hyperglycemia b. Impaired glucose tolerance c. Impaired fasting glucose d. Overt diabetes

7. A 16-year-old boy with rheumatic fever developed carditis which subsequently healed in a couple of weeks. How long will you administer benzathine penicillin G for secondary prophylaxis to him? a. Till 21 years of age b. Till 24 years of age c. Till 26 years of age d. Lifelong	8. A 2-year-old child on examination shows signs of vitamin A deficiency. What is the dose of Vitamin A to be administered to this child? a. 50000 IU b. 1 lakh IU c. 2 lakhs IU d. 2.5 lakhs IU
9. Project MONICA is related to a. Cardiovascular diseases b. Cervical cancer c. Breast cancer d. Road traffic accidents	10. Which of the following organisms is least likely to be associated with malignancies? a. Cytomegalovirus b. Epstein-Barr Virus c. HPV 6 and 11 d. Schistosoma
11. Which of the following has the highest net protein utilization values? a. Meat b. Milk c. Rice d. Soya	12. A Farmer has been consuming maize rich diet for many years. Which of the following would be lacking in his diet? a. Only tryptophan b. Lysine and threonine c. Lysine and tryptophan d. Methionine and cysteine
13. To counsel a patient to consume foods with low glycemic index. Which of the following would you advise him to eat? a. White bread b. Brown rice c. Whole grains d. Cornflakes	14. The recommended daily allowance of iron for pregnant woman in India is a) 19 mg/day b) 27 mg/day c) 23 mg/day d) 29 mg/day
15. While collecting data for the census which of the following people would you consider to be literate? a) A person who is able to read, write and understand in any language b) A person who is not able to read to write but can sign the document c) A person who is able to speak fluently in his native language but is not able to read/write d) A person who is able to read, but may not be able to write	16. The statements related to epidemic dropsy are all true except a. Contamination of mustard oil with argemone oil b. Symptoms are diarrhea, dyspnea & cardiac failure c. Preventive intervention is Vitamin C prophylaxis d. Nitric acid test is used to identify contamination
17. How much calcium does a premenopausal woman require on a daily basis? a. 1000 mg/d b. 800 mg/d c. 600 mg/d d. 1200 mg/d	18. Individuals with fluoride intake above which of the following are at risk of developing crippling fluorosis? a. >6 mg/L b. >1.5 mg/L c. >3 mg/L d. >10 mg/L
19. While studying a community, the researcher found 30%of the population to be below 15 years of age, and 10% was over 65 years of age. What is the total dependency ratio of this population? a) 20.4% b) 40% c) 66.6% d) 50%	20. Which of the following is not included in demographic process? a) Social mobility b) Marriage c) Morbidity d) Fertility

VELAMMAL MEDICAL COLLEGE, HOSPITAL AND RESEARCH INSTITUTE

Department of Community Medicine

Internal assessment II Batch 2020-21 2nd year MBBS

Marks: 100 (80 Descriptive +20 MCQs) Date: 16-09-2022

All questions are compulsory

LONG ANSWER QUESTIONS

2 ×15 = 30

1. Define primary health care. Describe the principles of primary health care? List the elements of primary health care. Describe the types of subcenters & enumerate the functions of medical officer of primary health center.(1+4+ 3+ 4 +3).

2. Classify epidemiological studies? Describe the steps involved in conducting a cohort study with an example. Mention the advantages and disadvantages of this study design. (3+8+ 2+2)

SHORT ANSWER QUESTIONS

10 × 5 = 50

1. Bias in Case control study
2. Biological effects of radiation
3. Epidemiological determinants of Monkey pox
4. Defense Mechanisms
5. Life cycle of Anopheles mosquito
6. Functions of Health communication
7. Dimensions of Health
8. Slow sand filter
9. Herd Immunity
10. Classification of Acute respiratory infection in a child aged 2 months upto 5 years

MULTIPLE CHOICE QUESTIONS

1 × 20 = 20

1. Which of the following is **NOT** a characteristic of diphtheria in an infected person?
a) Fatigue b)Fever and chills c) Difficulty in urination d) Bull-neck appearance

2. Physical quality of life index(PQL) includes the following parameters:
a. IMR(infant mortality rate), per capita calorie intake and life expectancy
b. IMR, life expectancy at 1 year and literacy
c. IMR, MMR(maternal mortality rate) and life expectancy
d. IMR, life expectancy at birth and literacy

3. Sentinel surveillance is employed to:
a. Establish natural history of disease
b. Detect the total number of cases of a disease in a community
c. Detect the missing/hidden cases in a community
d. Plan intervention

4. Which level of prevention is applicable for implementation in a population without any risk
a. Primordial prevention b. Primary prevention c. Secondary prevention d. Tertiary prevention

5. Which of the following show seasonal variation?
a. Viral conjunctivitis b. Gastroenteritis c. Measles d. Meningococcal meningitis
e. All of the above

6. Herd immunity is not useful in -
a) Diphtheria b) Tetanus c) Smallpox d)Mumps

7. 'Disability Limitation' is mode of intervention for which level of prevention
(a) Primordial (b) Primary (c) Secondary (d) Tertiary

8. The well known 'Framingham Heart Study' is an example of:
a. Case control study b. Nested case control study c. Cohort study d. Randomization study

9. Number of air changes in a drawing room per hour should be at least:
(a) 2-3 (b) 3-4 (c) 4-5 (d) 5-6

10. Daily exposure to noise above _____ causes permanent loss of hearing:
(a) 85 dB (b) 90 dB (c) 100 dB (d) 160 dB

11. Subacute sclerosing pan-encephalitis is associated with
a) Mumps b) Measles c) Rubella d) Typhoid e) Diphtheria

12. Which of the following viral infections is transmitted by tick?
(a) Japanese encephalitis (b) Dengue fever (c) Kyasanur forest disease (d) Yellow fever

13. An example of insecticide used for Space Spray is:
(a) Pyrethrum (b) Malathion (c) DDT (d) Paris green

14. Which is the correct sequence of various components of the 'communication process':
(a) Receiver, Message, Channel, Feedback, Sender
(b) Sender, Feedback, Message, Channel, Receiver
(c) Sender, Message, Channel, Receiver, Feedback
(d) Message, Sender, Channel, Feedback, Receiver

15. 'Learned behaviour which is socially acquired' is known as:
(a) Customs (b) Acculturation (c) Standard of living (d) Culture

16. Arrange the following stages of family cycle in chronological sequence:
(a) Formation, Extension, Complete extension, Dissolution, Contraction, Complete contraction
(b) Formation, Extension, Contraction, Complete extension, Complete contraction, Dissolution
(c) Formation, Contraction, Complete contraction, Extension, Complete extension, Dissolution
(d) Formation, Extension, Complete extension, Contraction, Complete contraction, Dissolution

17. One PHC is located for a population of:
(a) 10000 (b) 30,000 (c) 100,000 (d) 50,000

18. Live attenuated vaccines are all except
a) Measles b) Rabies c) Oral polio d) Yellow fever e) Influenza

19. Which of the following is true about meningococcal Meningitis
a) Case fatality less than 10% in untreated cases
b) Cases are the main source of infection
c) Rifampicin is the drug of choice
d) Treatment in the first 2 days can save the life of 95% cases

20. The first case of novel coronavirus was identified in
a). Beijing b) Shanghai c). Wuhan, Hubei d) Tianjin

VELAMMAL MEDICAL COLLEGE, HOSPITAL AND RESEARCH INSTITUTE
Department of Community Medicine
Internal assessment IV Batch 2019-20 3rd year MBBS
Marks: 100 (80 Descriptive +20 MCQs) Date: 10-10-2022
All questions are compulsory

LONG ANSWER QUESTIONS **2 ×15 = 30**

1. Define epidemiology, classify various epidemiological studies. Discuss in detail the steps of Randomized Controlled Trials. Add a note on various types of Randomized Controlled Trials (1+2+6+6).
2. Discuss in detail epidemiological features and diagnosis of AIDS. State the care, support and treatment services under NACP-IV. Add a note on Prevention of Parent-To-Child Transmission of HIV (4+8+3)

SHORT ANSWER QUESTIONS **10 × 5 = 50**

1. Indices of thermal comfort
2. Steps in an AEFI investigation
3. Evaluation of a screening test
4. Monkeypox
5. Epidemiological features of Cholera
6. Post-exposure prophylaxis in Rabies
7. Assessment of obesity
8. New initiatives in NRHM
9. Types of Under nutrition
10. New initiatives for promotion of family planning

MULTIPLE CHOICE QUESTIONS **1 × 20 = 20**

1. Which of the following is not a primary prevention strategy? (a) Breast self examination (b) Control of tobacco (c) Radiation protection (d) Cancer education	2. Sullivan's Index: (a) Measures disability (b) Measures life years adjusted with death (c) Measures life expectancy free of disability (d) Measures life expectancy
3. A city has a population of 10000 with 500 diabetic patients. A new diagnostic test gives true positive result in 350 patients and false positive result in 1900 patients. Which of the following is/ are true regarding the test? (multiple responses) (a) Prevalence is 5% (b) Sensitivity is 70% (c) Specificity is 80% (d) Sensitivity is 80% (e) Specificity is 70%	4. A 10 month old child is brought to a PHC with history of cough and cold. On examination, he has respiratory rate of 48 breaths per minute and there is absence of chest indrawing. His weight is 5 kg. He is probably suffering from (a) No pneumonia (b) Pneumonia (c) Severe pneumonia (d) Very severe pneumonia
5. The usual incubation period for pertussis is: (a) 7-14 days (b) 3-5 days (c) 21-25 days (d) Less then 3 days	6. A lactating woman has sputum positive Tuberculosis and her neonate child is 3 months old. What is the recommended chemoprophylaxis? (a) INH 3mg/kg for 3 months (b) INH 5mg/kg for 3 months (c) INH 3mg/kg for 6 months (d) INH 5mg/kg for 6 months

7. Which of the following is not a type of Vaccine derived polio virus? (a) cVDPV (b) iVDPV (c) aVDPV (d) mVDPV	8. Which statement is not true in arboviral disease? (a) Japanese encephalitis is transmitted by culex (b) KFD is transmitted by Ticks (c) Filariasis is transmitted by Aedes mosquito (d) Dengue is transmitted by Aedes mosquito
9. Best determinant index of recent transmission of malaria: (a) Infant parasite rate (b) ABER (c) Splenic rate (d) Annual parasite index	10. Disinfecting action of chlorine on water is mainly due to: (a) Hydrogen chloride (b) Hypochlorous acid (c) Hypochlorite ions (d) Hydrogen ions
11. Criteria for drinking water quality recommended by WHO includes(multiple responses): (a) Colour <15 TCU (b) pH 6.5 – 8.5 (c) Chloride 200-600 mg/l (d) Turbidity <5 NTU (e) Zinc <4 mg/l	12. The best parameter to measure air pollution is: (a) SO2 (b) CO2 (c) CO (d) N2O
13. Best method for disposal of refuse where land is available: (a) Burial (b) Dumping (c) Manure pit (d) Controlled tipping	14. Non medicated Intra Devices (IUDs) are called as: (a) 3rd generation IUDs (b) 2nd generation IUDs (c) 1st generation IUDs (d) Multi – load devices
15. A health worker who distributes O.C pills checks all of the following except: (a) Headache (b) Weight gain1 (c) Breast tenderness (d) Pervaginal bleeding	16. Carrier state is not important in transmission of: (a) Typhoid (b) Poliomyelitis (c) Measles (d) Diphtheria
17. Which of the following is the initial-most step in investigation of an epidemic ? (a) Defining the population at risk (b) Confirmation of existence of an epidemic (c) Verification of diagnosis (d) Rapid search for all cases and their characteristics	18. Not included among major criteria in acute rheumatic fever is: (a) Erythema marginatum (b) Polyarthralgia (c) Chorea (d) Pancarditis CANCERS
19. Xerophthalmia is a problem in a community if the prevalence of Bitot's spots is more than: (a) 1 % (b) 0.5 % (c) 5 % (d) 25 %	20. Ergotism is due to toxic alkaloids produced by fungus: (a) Trichophyton (b) Claviceps purpurea (c) Fusarium species (d) Absidia

Course File
Batch 2015-2016

Final MBBS – 2019 -2020

Department of Psychiatry

Velammal Medical College Hospital and Research Institute
Anupanadi – Madurai-09

COURSE FILE

Department: **Department of Psychiatry**
Year to whom subject is offered: **MBBS batch 2015-2016**
Final year 2019-2020
Name of the Subject: **Psychiatry**
Faculty names :
Dr.Ramanujam.V **Professor and HOD**
Dr. Rena Rosalind **Assistant Professor**
Dr.Sugaparaneetharan **Assistant Professor**
Dr. Vidhya.S **Senior resident**

Cover page

VELAMMAL MEDICAL COLLEGE HOSPITAL AND RESEARCH INSTITUTE
COVER PAGE
NAME OF THE DEPARTMENT

Name of the Subject: PSYCHIATRY
Name of the Program:UG - MBBS

Year : IV **Updated On : 11.07.2019**

Prepared by :

- **Name :Dr. Vidhya.S**
- **Sign :**
- **Designation : Senior resident**
- **Date :10.7.2019**

Verified by :

1. **Name : Dr. Rena Rosalind**
2. **Sign :**
3. **Designation : Associate Professor**
4. **Date :11.07.2019**

Approved by :

1. **Name : Dr.Ramanujam**
2. **Sign :**
3. **Date : 11.07.2019**

Syllabus

Paper –I : Basic sciences as related to psychiatry:

Basic aspects of biological sciences and their relation/application/ association with
mental health, illness and disease:

1.Structural and functional neuroanatomy
2. Neurodevelopment and neurogenesis
3. Neurophysiology
4. Receptors, neurotransmitter, neuropeptides and neurotrophic factors
5. Basic and applied electrophysiology
6. Basic science of sleep
7. Psycho neuro endocrinology
8. Chronobiology
9. Genetics
10.Brain imaging in psychiatry

Behavioral Sciences as applied to Psychiatry:

Basic aspects of psychological and social sciences and their
relation/application/association with mental health, illness and disease:

1. Growth and developmental process in childhood and adolescence
2. Sensation, perception and cognition
3. Consciousness
4.Intelligence and aptitude
5. Motivation
6. Feelings and emotions
7. Learning and memory
8. Information processing
9. Personality
10.Communication
11. Abnormal psychology and psychopathology
12. Sociology and psychosocial work
13.Anthropology and culture
14. Public opinion, consumer- survivor movement, antipsychiatry movement
15. Research methodology, epidemiology and statistics
16. Evidence based medicine and psychiatry
17. Principles of Bioethic

Paper- II : Clinical Psychiatry

Etiology, pathology, clinical features, diagnosis, differential diagnosis, treatment and management of psychiatric disorders including:

1.Historical of psychiatry
2.Signs and symptoms of psychiatric illnesses: psychiatric interview, history and mental status examination
3.Diagnosis in psychiatry, classificatory systems, psychiatric rating scales, medical assessment and laboratory testing in psychiatry, clinical neuropsychology, psychiatry report
4.Delirium, dementia and neurocognitive disorders
5.Psychiatric disorders secondary to medical disease
6.Substance related disorders
7.Schizophrenia and other psychotic disorders

8.Mood disorders
9.Anxiety disorders
10.Somatoform disorders
11.Chronic fatigue syndrome
12.Factitious disorder
13.Dissociative disorders
14.Eating disorders
15.Sleep and sleep disorder
16.Impulse control disorders
17.Sexual disorders
18.Adjustment disorders
19.Personality disorders
20.Psychiatry and reproductive medicine
21.Relational problems
22.Problems related to abuse and neglect
23. Emergency psychiatric medicine
24.Aggression and violence
25.Suicide and deliberate self -harm
26.Death, dying, grief and bereavement
27.Culture bound syndromes
28. Psychotherapies: Psychoanalytical/dynamic, cognitive behavioral, interpersonal, family, group therapy, etc
29. Biological therapies: psychotropic medication, ECT and other brain stimulation techniques, psychosurgery, etc
30.Complementary and alternative medicine in psychiatry
31.Ethics in psychiatry

Paper- III : Psychiatric specialties, general medicine and neurology related to psychiatry

Etiology, pathology, clinical features, diagnosis, differential diagnosis, treatment and management of psychiatric disorders including:

1.Child and adolescent psychiatry including intellectual disability, learning disorders, developmental and communication disorders, attention deficit disorders, disruptive behavior, eating, feeding and elimination disorders, movement and tic disorders, attachment disorders, anxiety and mood disorder, suicide, psychosis and substance abuse, legal aspects
2.Consultation-Liaison Psychiatry
3.Psychiatric aspects of neurological diseases
4.Psychiatric aspects of medical disease
5.Psychosocial rehabilitation
6.Prevention of mental distress, illness and disease

Paper IV :

Recent advances in psychiatry including forensic psychiatry and community mental health

1.Recent advances related to psychiatric disorders and their management
2.Forensic psychiatry and legal aspects
3.Community mental health, district, state and national programs

Vision and Mission

VISION

The Department of Psychiatry works to ensure humane care and effective treatment for all persons with mental illness, including substance use disorders. Its vision is a society that has available, accessible quality psychiatric diagnosis and treatment.

MISSION

The mission of the Department of Psychiatry is to

- Promote the highest quality care for individuals with mental illness, including substance use disorders, and their families
- Promote psychiatric education and research
- Advance and represent the profession of psychiatry
- Provide clinical services- Tertiary, strengthen primary & secondary,
- Teaching and training at PG level, build capacity
- Conduct research that deepens our understanding of the development, pathophysiology, and prevention of psychiatric illness and the nature of human behavior, and apply this knowledge to the development and delivery of more effective, evidence-based treatments.
- Offer comprehensive treatment and consultation to our patients, their families, and the community.
- Provide outstanding mental health education and multidisciplinary training to the next generation of healthcare providers and investigators.

Goals

To promote the rights and best interests of patients and those actually or potentially making use of psychiatric services for mental illness, including substance use disorders.

- To improve access to and quality of psychiatric services.
- To improve research into all aspects of mental illness, including causes, prevention, and treatment of psychiatric disorders.
- To improve psychiatric education and training.
- To promote optimal conditions for practice and career satisfaction.
- To foster collaboration among all who are concerned with medical, psychological, socio-cultural and legal aspects of mental health and illness.

PEOs AND PO

Program Educational Objectives

At the end of MBBS program, the medical student should be able to:

PEO1. Diagnose and manage common health problems of the individual and the community, commensurate with his/her position as a member of the health team at the primary, secondary or tertiary levels, using his/her clinical skills based on history, physical examination and relevant investigations.

PEO2. Practice preventive, promotive, curative and rehabilitative medicine in respect to the commonly encountered health problems.

PEO3. Appreciate rationale for different therapeutic modalities, be familiar with the administration of the "essential drugs" and their common side effects.

PEO4. Appreciate the socio-psychological, cultural, economic and environmental factors affecting health and develop humane attitude towards the patients in discharging one's professional responsibilities.

PEO5. Be familiar with the various National Health Programs, and the ways in which they are being implemented.

PEO.6 Demonstrate communication skills, both verbal and written to establish effective communication with the clients (patients, relatives, and general public), health team partners, and scientific community.

PEO.7 Develop attitude for self-learning and acquire necessary skills including the use of appropriate technologies, for pursuing self-directed learning for a life time.

Program Outcomes

At the end of the M.B.B.S. training program the student should have the requisite knowledge, skills, attitudes, values and responsiveness, so that they may function appropriately and effectively as a Basic Doctor, Physicians of first contact for the community in the primary care setting both in urban as well as rural areas of our country.

To fulfil these objectives the doctor must be able to function appropriately and effectively in the following roles

PO1. Clinician, who understands and provides preventive, promotive, curative, palliative and holistic care with compassion.

PO.2 Leader and member of the health care team and system with capabilities to collect, analyse and synthesize health data.

PO.3 Communicator with patients, families, colleagues and community.

PO.4 Lifelong learner committed to continuous improvement of skills and knowledge.

PO.5 Professional, who is committed to excellence, is ethical, responsive and accountable to patients, community, and profession.

COURSE OBJECTIVES AND OUTCOMES

Psychiatry Course Objectives

Unit I: Clinical Skills
Topic Area A: History-Taking, Examination and Medical Interviewing

Rationale:
CS1. To evaluate and care for any patient, the clinician must be skillful with developmentally and culturally competent communication methods in obtaining relevant historical information and performing a complete examination. Although the comprehensiveness of an examination may vary based on the situation, in addition to a general physical exam, physicians should be able to perform a mental status exam and accurately describe the findings.

CS2. For effective history taking and patient evaluation, a clinician must have an understanding, ability, and self-awareness to flexibly use a range of empathic interviewing techniques with patients a) across the lifespan including children, adolescents, adults, and the elderly; b) across cultures; and c) with persons afflicted with mental illness or experiencing considerable distress.

Prerequisites:
CS3.In the pre-clinical/pre-clerkship curriculum, the student should be introduced to 1) the basic elements of a comprehensive History and Physical Exam, including the Mental Status Exam; 2) basic interviewing techniques; and 3) the importance and complexity of the physician-patient relationship and variables relevant to a range of patient populations.

Learning Objectives: Core
By completion of the medical school, the student will be able to:

CS4. Elicit and accurately document a complete psychiatric history, including the identifying data, chief complaint, history of the present illness, past psychiatric history, medications (psychotropic and non-psychotropic), general medical history, review of systems, substance use history, family history, and personal and social history

CS5. Perform an appropriate physical exam on patients with presumed psychiatric disorders as described below

CS6. Recognize and discuss bodily signs and symptoms that accompany classic psychiatric disorders (e.g., tachycardia and hyperventilation in panic disorder);

CS7. Discuss the extent to which a general medical illness may contribute to the signs and symptoms of a psychiatric disorder;

CS8. Recognize and discuss the possible manifestations of psychotropic drugs (e.g., medications and drugs of abuse) in the physical exam, and
d) make recommendations for further evaluation including appropriate laboratory, imaging, psychometric and other medical testing

CS9. Recognize the importance of, and be able to obtain and interpret, historical data from multiple sources including family members, community mental health resources, primary care providers, religious and spiritual leaders, old records, child's teachers, primary care physician, indigenous and complementary/alternative providers, etc.

CS10. Perform and accurately describe the components of the comprehensive Mental Status Examination (e.g., including general appearance and behavior, motor activity, speech, affect, mood, thought processes, thought content, perception, sensorium and cognition, abstraction, intellect, judgment, and insight.) Describe variations in presentation according to age, stage of development and cultural background

CS11. Describe common abnormalities, and their causes, for each component of the Mental Status Exam

CSS12. Perform common screening exams for common psychiatric disorders (e.g., CAGE, MMSE, etc.)

CS13. Discuss and use basic strategies for engaging and putting patients at ease in challenging interviews (e.g., with patients who are disorganized, cognitively impaired, hostile/resistant, mistrustful/fearful, circumstantial/hyperverbal, unspontaneous/hypoverbal, potentially assaultive; when being assisted by an interpreter). Describe different interviewing techniques for different ages

CS14. Demonstrate an effective repertoire of interviewing skills including: appropriate initiation of the interview; establishing rapport; the appropriate use

of open-ended and closed questions; techniques for asking "difficult" questions; the appropriate use of facilitation, empathy, clarification, confrontation, reassurance, silence, summary statements; soliciting and acknowledging expression of the patient's ideas, concerns, questions, and feelings about their illness and its treatment; communicating information to patients in a clear fashion; appropriate closure of the interview; and be able to perform these basic interviewing skills in performing a family assessment

CS15. Discuss and avoid the common pitfalls in interviewing technique including: interrupting the patient unnecessarily; asking long, complex questions; using jargon; asking questions in a manner suggesting the desired answer; asking questions in an interrogatory manner; ignoring patient verbal or nonverbal cues; making sudden inappropriate changes in topic; indicating patronizing or judgmental attitudes by verbal or nonverbal cues

CS16. Discuss indications, challenges and methods for successfully eliciting an accurate history and performing a mental status exam with patients across the lifespan, those with communication impairments (e.g., deafness), and those from diverse ethnic, linguistic and cultural backgrounds;

Learning Objectives: Enhancement

CS17. Explain the value of skillful interviewing to the satisfaction of both the patient and the doctor and how this increases the likelihood of an optimal clinical outcome

CS18. Identify strengths and weaknesses in personal interviewing skills and discuss with a colleague or supervisor

CS19. Identify verbal and nonverbal expressions of affect in a patient's responses, and apply this information in assessing and treating the patient

CS20. Discuss the indications, challenges, and methods for the optimal use of an interpreter when performing a psychiatric evaluation

Topic Area B: Documentation and Communication

Rationale:

CS21. Regardless of the clinical specialty, a physician must be able to properly document clinical findings, diagnostic impressions, and clinical reasoning. The physician must be able to communicate clearly and concisely to other professionals and to patients and their families, in both written and oral formats. These skills are particularly important for communicating about psychiatric disorders where obvious laboratory or physical findings may not be present.
Prerequisites:

CS22.In the pre-clinical/pre-clerkship curriculum, the student should be introduced to the standard formats for documenting comprehensive evaluations, focused examinations, and daily patient progress. The student should have opportunities to present clinical data and reasoning in an oral format.

Learning Objectives: Core

By completion of the clerkship/medical school, the student will be able to:

CS23. Accurately document a complete psychiatric history and appropriate examination and accurately record and communicate the components of a comprehensive mental status examination

CS24. Accurately document the daily or periodic progress of patients psychiatric disorders recording mental status changes and diagnostic impressions

CS25. Provide a clear and concise oral presentation of a) a complete psychiatric evaluation including relevant history, mental status findings and diagnostic impressions, and b) the daily or periodic progress of patients being treated for psychiatric disorders

CS26. Communicate clinical impressions, treatment recommendations including risks and benefits, and other relevant education to assigned patients and their families

CS27. Document assessment of patient's degree of risk to self and others and assessment of competency to participate in medical decision-making (See section I.D.)

Topic Area C: Clinical Reasoning and Differential Diagnosis

Rationale:

CS28.Accurately identifying a patient's problems and the relevant signs and symptoms is basic to establishing a diagnosis in any field of medicine. In psychiatry patients may lack insight into the problems they are having and insist that nothing is wrong. Hence, to be skillful at discerning signs and symptoms of psychiatric disorders the physician must have a heightened level of suspicion, be knowledgeable about symptom clusters that are suggestive of specific disorders, and be able to formulate reasonable diagnostic hypotheses with plans for further evaluation. To be successful, the physician must also be able to incorporate knowledge about the range of normal behaviors at various ages and stages of development.

Prerequisites:

CS29. In the pre-clinical/pre-clerkship curriculum, the student should be introduced to basic principles of patient examination and differential diagnosis. They should be introduced to signs and symptoms of common psychiatric disorders in psychopathology coursework.

Learning Objectives: Core

By the end of the clerkship/medical school, students will be able to:

CS30. Use the DSM-IV to identify signs and symptoms that comprise specific syndromes or disorders and construct diagnoses using the five axes system

CS31. Formulate a differential diagnosis and plan for assessment of common presenting signs and symptoms of psychiatric disorders (e.g., insomnia, behavioral dyscontrol, confusion, hallucinations, delusions, etc.) including appropriate laboratory, imaging, psychometric and other medical testing

CS32. Discuss the indications for, how to order, and the limitations of common medical tests for evaluating patients with psychiatric symptoms including laboratory, imaging, psychometric and other psychological and medical tests 4. Interpret basic test results and consultant reports relevant to working through a

differential diagnosis of designated patients with psychiatric disorders and general medical conditions with psychiatric manifestations

CS33. Assess, record and interpret mental status changes of designated patients, and alter diagnostic hypotheses and management recommendations in response to these changes

Learning Objectives: Enhancement

CS34. Discuss the different types of neuropsychological testing, and state indications for each

Topic Area D: Assessment of Psychiatric Emergencies

Rationale:

CS35.Psychiatric emergencies may occur in any clinical or non-clinical setting and are life threatening. An effective physician must be able to recognize potential psychiatric emergencies and initiate an intervention. Although suicide is the most common psychiatric emergency the list of emergent conditions is lengthy and diverse ranging from suicidality and homicidality, to catatonia, intoxication, delirium, and severe drug reactions. It is important for physicians to be able to perform risk assessments, evaluate patients with altered mental status or behavioral dyscontrol, and recognize signs of potential assaultive behavior. Prerequisites: In the pre-clinical/pre-clerkship curriculum, the student should be introduced to the possible emergent presentations of patients with psychiatric disorders and particular risks associated with psychotropic pharmacotherapy.

Learning Objectives: Core

By completion of the clerkship/medical school, the student will be able to:
CS36. Identify and discuss risk factors for suicide across the lifespan

CS37. Conduct diagnostic and risk assessments of a patient with suicidal thoughts or behavior and make recommendations for further evaluation and management

CS38. Identify and discuss risk factors for violence and assaultive behavior

CS39. Discuss signs of escalating violence and review the appropriate safety precautions and interventions

CS40. Discuss the differential diagnosis and conduct of a clinical assessment of a patient with potential or active violent behavior and make recommendations for further evaluation and management including appropriate laboratory, imaging, psychometric and other medical testing

CS41. Discuss the clinical assessment and differential diagnosis of a patient presenting with psychotic symptoms such as perceptual disturbance, bizarre ideation and thought disorder, and make recommendations for further evaluation and management including appropriate laboratory, imaging, psychometric and other medical testing

CS42. Discuss the clinical assessment and differential diagnosis of a patient with impaired attention, altered consciousness and/or other cognitive abnormalities and make recommendations for further evaluation and management including appropriate laboratory, imaging, psychometric and other medical testing

CS43. Analyze risk factors and make recommendations for psychiatric hospitalization versus an ambulatory disposition in the management of designated patients

Learning Objectives: Enhancement

CS44. Discuss the indications, precautions and proper use of physical restraint
10. Discuss the indications, precautions and proper use of pharmacotherapy for violent behavior

CS45. Recognize and differentiate the common signs and symptoms of psychotropic drug toxicity (e.g., hyponatremia, Stevens-Johnson syndrome,

serotonin syndrome, neuroleptic malignant syndrome, lithium toxicity, etc.) (see III.B. Pharmacologic Therapies) and discuss treatment interventions

CS46. Be able to assess survivors of trauma (e.g., rape, natural disaster, terrorism, war, political persecution), discuss differential diagnosis, and make recommendations for further evaluation and management

UNIT II : Psychopathology and Psychiatric Disorders

The typical signs and symptoms of common psychiatric disorders as outlined below should be learned and understood at each phase of the life cycle (ie.,children, adolescent ,adult and geriatric population) and across language and cultural groups.The clerkship learning experiences should uild on an established understanding o basic principles of neuroiollogy and psychopathology derived ffrom the pre clerkship curriculum

Topic Area A: Cognitive Disorders
Rationale:

CD1.Cognitive impairment is a presenting sign or symptom or many medical conditions. Regardless of medical speciality , a physician should be able to make an initial assessment of cognition with attention topossile emergent underlying conditions,be able to appropriately use cognitive assessment tools accounting for language and cultural variations be familiar with the common causes of cognitive impairment and proceed with or refer patients for further evaluation and management.

Prerequisites :

CD2. In the pre clinical curriculum the student should be introduced to common conditions associated with disturbance of cognition and be familiar with normal developmental stages of cognition

Learning objective :Core
By completion of the clerkship the student will be able to

CD3. Differentiate and discuss the cognitive, emotional and behavioral manifestations of common Cognitive Disorders including Delirium and Dementia syndromes

CD4. Perform cognitive assessments to evaluate new patients and monitor patients with identified cognitive impairment, and discuss challenges to assessment related to the patient's cultural background and developmental level

CD5. Recognize the prevalence of Delirium in various clinical settings and across the lifespan, and discuss the clinical features and differential diagnosis of the delirious patient with recommendations for evaluation and management

CD6. Differentiate the clinical features and course of the common types of Dementia including Alzheimer's, Vascular, Lewy Body and those syndromes caused by other neurodegenerative and infectious diseases (e.g., Parkinson's, HIV infection, Huntington's, Pick's, Creutzfeldt-Jakob, etc.)

CD7. Recognize the clinical features and discuss the differential diagnosis of a patient presenting with cognitive impairment and make recommendations for diagnostic evaluation and management including appropriate laboratory, imaging, psychometric and other medical testing

Learning Objectives: Enhancement

CD8. Discuss the clinical features, differential diagnosis, evaluation and management of Amnestic Disorders due to common general medical conditions including seizure disorders, substance use disorders, and head injuries

CD9. Maintain a high index of suspicion that disordered cognition and behavior may have an underlying reversible cause and make recommendations for comprehensive evaluation including appropriate laboratory, imaging, psychometric and other medical testing

Topic Area B: Substance Use Disorders
Rationale:

SU1.Substance use disorders are prevalent among patients in all clinical settings. There is a particularly high comorbidity between substance use

disorders and other psychiatric disorders and medical conditions, which has a negative affect on clinical course and prognosis. Regardless of medical specialty the clinician should be able to recognize signs and symptoms of possible Substance Use Disorders, make initial assessment with attention to possible underlying emergent conditions (e.g., withdrawal delirium), and proceed with or refer the patient for further evaluation and management.

Prerequisites:

SU2.In the pre-clinical/pre-clerkship curriculum the student should be introduced to the phenomenology, pathophysiology, and relevant treatment interventions for substance use disorders

Learning Objectives: Core

By completion of the clerkship/medical school, the student will be able to:
SU3. Obtain a thorough substance use history through the use of empathic, nonjudgmental interviewing techniques and established screening instruments (e.g., CAGE), accounting for the patient's developmental stage and cultural background, and gather and incorporate information from collateral sources

SU4. Compare and contrast diagnostic criteria for substance abuse versus dependence

SU5. Know the clinical features of intoxication with cocaine, amphetamines, hallucinogens, cannabis, phencyclidine, barbiturates, opiates, caffeine, nicotine, benzodiazepines, alcohol and anabolic steroids

SU6. Recognize the clinical signs and recommend management strategies for substance withdrawal from sedative hypnotics including alcohol, benzodiazepines and barbiturates

SU7. Discuss the epidemiology, course of illness, and the medical and psychosocial complications of common substance use disorders

SU8. Discuss typical presentations of substance use disorders in general medical and psychiatric clinical settings

SU9. Discuss management strategies for substance abuse and dependence including detoxification, 12-step programs, support groups (e.g., AA, NA, ALANON), pharmacotherapy, rehabilitation programs, psychotherapies, and family support

Learning Objectives: Enhancement

SU10. Discuss the characteristic presenting features and approach to managing the drug-seeking patient

Topic Area C: Psychotic Disorders
Rationale:

PD1.Patients with symptoms of psychosis can present in any clinical setting. By their very nature the signs and symptoms of psychosis are often associated with impaired insight, considerable distress for the patient and their families, and the potential to evolve into an emergent, life-threatening situation. Regardless of medical specialty, clinicians should be able to recognize the signs and symptoms of possible Psychotic Disorders, make initial assessment with attention to possible emergent underlying conditions, and proceed with or refer for further evaluation and management.

Prerequisites:

PD2.In the pre-clinical/pre-clerkship curriculum the student should be introduced to the phenomenology, pathophysiology, and relevant treatment interventions for psychotic disorders

Learning Objectives: Core

By completion of the clerkship/medical school, the student will be able to:

PD3. Define the term psychosis and discuss the clinical manifestations and presentation of patients with psychotic symptoms

PD4. Recognize that psychosis is a syndrome and discuss the broad differential diagnosis, including both primary psychiatric as well as other types of medical conditions, which necessitates a thorough medical evaluation for all patients presenting with signs and symptoms of psychosis

PD5. Develop a differential diagnosis and plan for further evaluation of patients presenting with signs and symptoms of psychosis including appropriate laboratory, imaging, psychometric and other medical testing

PD6. Compare and contrast the clinical presentation of psychotic disorders in children and adolescents, adults, the elderly, patients in a general medical practice setting, the developmentally disabled, and accounting for cultural diversity (i.e., distinguishing psychotic disorders from culturally appropriate spiritual experiences and healing traditions such as shamanism and faith healing)

PD7. Compare and contrast the clinical features and course of common psychiatric disorders that present with associated psychotic features

PD8. Discuss epidemiology, clinical course, prodromal stages, subtypes, and the positive, negative and cognitive symptoms of Schizophrenia

PD9. Recommend management of patients with Schizophrenia and other psychotic disorders including all relevant interventions (i.e., biological, psychological, social)

Learning Objectives: Enhancement

PD10. Discuss the theories of etiology and pathophysiology of Schizophrenia and other psychotic disorders

PD11. Discuss the magnitude of the public health issues posed by Schizophrenia and related disorders (e.g., homelessness, loss of human potential)

Topic Area D: Mood Disorders

Rationale:

MD1.Mood Disorders are prevalent, serious and highly treatable conditions encountered in all clinical settings. Although sometimes difficult to diagnose, unrecognized and untreated mood disorders are associated with considerable morbidity and mortality. A physician should be able to recognize signs and symptoms of possible Mood Disorders, make initial assessment with attention to possible emergent underlying conditions and risk of suicidal and/or homicidal behavior, and proceed with or refer for further evaluation and management.

Prerequisites:

MD2.In the pre-clinical/pre-clerkship curriculum the student should be introduced to the phenomenology, pathophysiology, and relevant treatment interventions for mood disorders.

Learning Objectives: Core

By completion of the clerkship/medical school, the student will be able to:

MD3. Discuss the epidemiology of mood disorders with special emphasis on the prevalence of depression in the general population and in non-psychiatric clinical settings among patients with other medical-surgical illness (e.g., cardiovascular disease, cancer, neurological conditions) and the impact of depression on the morbidity and mortality of other medical-surgical illness

MD4. Compare and contrast the features of unipolar and bipolar mood disorders with regard to clinical course, comorbidity, family history, prognosis and associated complications (e.g., suicide)

MD5. Discuss the differential diagnosis for patients presenting with signs and symptoms of mood disturbance, including primary mood disorders (e.g., Bereavement, Major Depressive Disorder, Bipolar Disorders, Adjustment Disorder, etc.) and mood disorders secondary to other conditions (e.g., substance use, underlying medical-surgical illness) with regard to clinical course, comorbidity, family history, prognosis, associated complications (e.g., suicide), and plan for further evaluation including appropriate laboratory, imaging, psychometric and other medical testing

MD6. Discuss the subtypes of primary mood disorders including unipolar versus bipolar, melancholic versus atypical depressive features, psychotic features, seasonal pattern, postpartum onset, etc.

MD7. Compare and contrast the prevalence and clinical presentation of mood disorders in children and adolescents, adults, the elderly, patients in a general medical practice setting, the developmentally disabled, and across cultural, economic, and gender groups

MD8. Discuss the high risk of suicide in patients with mood disorders, risk assessment and management strategies (See Unit I. D. Assessment of Psychiatric Emergencies)

MD9. Recommend management of patients with primary or secondary mood disorders including all relevant interventions (i.e., biological, psychological, social)

Learning Objectives: Enhancement

MD10. Discuss the theories of etiology and pathophysiology of mood disorders

Topic Area E: Anxiety Disorders
Rationale:

AD1.Anxiety Disorders are considered one of the most prevalent classes of psychiatric disorders and as such are likely to be encountered in all clinical settings. It is important for clinicians not only to recognize signs and symptoms of anxiety but also to be familiar with the diagnostic criteria for various anxiety disorders, be able to make an initial assessment with some precision and with attention to possible emergent underlying conditions, and proceed with or refer the patient for further evaluation and management.

Prerequisites:

AD2.In the pre-clinical/pre-clerkship curriculum the student should be introduced to basic theories of learning and the phenomenology, pathophysiology, and relevant treatment interventions for anxiety disorders.

Learning Objectives:

Core By completion of the clerkship/medical school, the student will be able to:

AD3. Discuss the epidemiology of anxiety disorders with special emphasis on the prevalence of anxiety in the general population and in non-psychiatric clinical settings and its effect on total health care expenditures in the U.S.

AD4. Discuss the differential diagnosis for patients presenting with anxiety, including primary anxiety disorders (e.g., Phobias, Panic Disorder, Adjustment Disorder, etc.) and anxiety disorders secondary to other conditions (e.g., substance use, underlying medical-surgical illness) with regard to developmental stage, developmental disability, cultural background, medical practice setting, clinical course, comorbidity, family history, prognosis, associated complications, and plan for further evaluation including appropriate laboratory, imaging, psychometric and other medical testing

AD5. Discuss the epidemiology and distinguish the clinical course, co-morbidity, family history and prognosis of Obsessive Compulsive Disorder

AD6. Discuss the epidemiology and distinguish the clinical course, co-morbidity, family history and prognosis of Acute and Post-traumatic Stress Disorders

AD7. Recommend management of patients with primary or secondary anxiety disorders including all relevant interventions - psychotherapies (e.g., relaxation, exposure-response prevention, etc), pharmacotherapies, etc.

Learning Objectives: Enhancement

AD8. Discuss the theories of etiology and pathophysiology of anxiety disorders

Topic Area F: Somatoform Disorders, Factitious Disorder and Malingering Rationale:

SD1. By their very nature, Somatoform Disorders frequently present in non-psychiatric settings. If the physician does not have an understanding of Somatoform Disorders, patients with these conditions are likely to be misdiagnosed, receive unnecessary treatments or become a focus of hostility. All physicians should be able to recognize signs and symptoms of possible Somatoform Disorders, Factitious Disorder and Malingering, make initial assessment with attention to actual underlying pathology, and proceed with or refer patients for further evaluation and management.

Prerequisites:

SD2. In the pre-clinical/pre-clerkship curriculum the student should be introduced to the phenomenology, pathophysiology, and relevant treatment interventions for Somatoform Disorders and Factitious Disorder.

Learning Objectives: Core

By completion of the clerkship/medical school, the student will be able to:

SD3. Compare and contrast the signs, symptoms, clinical characteristics and course, and prognosis of specific Somatoform Disorders including Somatization Disorder, Conversion Disorder, Pain Disorder, Body Dysmorphic Disorder, and Hypochondriasis

SD4. Compare and contrast the characteristic features of Factitious Disorder and Malingering and distinguish these conditions from the Somatoform Disorders

SD5. Discuss the principles and challenges to physicians of ongoing evaluation and management of patients with Somatoform Disorders, Factitious Disorder and Malingering

Topic Area G: Dissociative and Amnestic Disorders
Rationale:

DD1. Persons who experience trauma and patients with personality disorders may suffer dissociative symptoms. These persons may present in any clinical setting. Despite the disability associated with dissociative disorders they may go undetected and untreated. All physicians should be able to recognize signs and symptoms suggestive of a dissociative disorder and refer patients for further evaluation and treatment.

Prerequisites:

DD2.In the pre-clinical/pre-clerkship curriculum, the student should be introduced to common neurobiological and psychological models of human development and to the phenomenology, pathophysiology, and relevant treatment interventions for dissociative disorders.

Learning Objectives: Core

By completion of the clerkship/medical school, the student will be able to:

DD3. Define “dissociation”

DD4. Discuss the hypothesized role of psychological trauma in the development of disorders characterized by dissociation and altered memory (e.g., Acute Stress Disorder, PTSD, Borderline Personality, Dissociative Identity Disorder)

Learning Objectives: Enhancement

DD5. List a differential diagnosis for patients presenting with amnesia and propose a plan for further evaluation including appropriate laboratory, imaging, psychometric and other medical testing, referral and management

DD6. Compare and contrast the clinical features of Dissociative Amnesia, Dissociative Fugue, Depersonalization Disorder and Dissociative Identity Disorder

Topic Area H: Eating Disorders

Rationale:

ED1.Eating Disorders are potentially life-threatening conditions. These conditions occur across the life span and despite their prevalence may go undetected and unaddressed. Patients with eating disorders may present in any clinical setting. Hence, all physicians should be able to recognize the signs and symptoms suggestive of an eating disorder and refer patients for further evaluation and treatment. Prerequisites: In the pre-clinical/pre-clerkship curriculum the student should be introduced to the phenomenology, pathophysiology, and relevant treatment interventions for eating disorders.

Learning Objectives: Core

By completion of the clerkship/medical school, the student will be able to:

ED2. Discuss the clinical features, course, complications including mortality, and prognosis of common Eating Disorders (e.g., Anorexia Nervosa, Bulimia, Obesity)

ED3. Propose plans for further evaluation, referral, and management, including discussion of clinical features suggesting the need for hospitalization of patients with possible Eating Disorders

Learning Objectives: Enhancement

ED4. Differentiate Eating Disorders based on DSM-IV diagnostic criteria

ED5. Discuss the role of the primary care physician in the prevention and early detection of Eating Disorders

Topic Area I: Sexual Disorders

Rationale:

SD1.Sexual Disorders are diverse and prevalent. Patients with sexual disorders may present in any clinical setting. Despite the considerable morbidity associated with sexual disorders, they may go undetected because of their

sensitive nature. All physicians should be able to obtain an accurate sexual history, recognize signs and symptoms suggestive of sexual disorders, and refer patients for further evaluation and treatment.

Prerequisites:
In the pre-clinical/pre-clerkship curriculum, the student should be introduced to

SD2. the anatomy and physiology of the male and female sexual response cycles,
SD3. normal sexual development including gender identity and gender role, and
SD4. the important components and process of obtaining a comprehensive sexual history.

Learning Objectives: Core

By completion of the clerkship/medical school, the student will be able to:
SD5. Obtain and document a sexual history and interpret findings to formulate a differential diagnosis accounting for patient age, developmental stage, sexual orientation, and cultural background

Learning Objectives: Enhancement

SD6. Discuss primary versus secondary sexual dysfunction related to other clinical disorders and make recommendations for further evaluation, referral, and management

SD7. Define “paraphilia”, list common paraphilias, and make recommendations for further evaluation, referral, and management

SD8. Evaluate patients with dysphoria related to gender identity and make recommendations for referral for further evaluation and management Topic

Area J: Sleep Disorders
Rationale:
SD1.Sleep Disorders are prevalent, treatable conditions associated with considerable morbidity. Persons with sleep disorders may present in any clinical setting. Hence all physicians should be able to obtain an accurate sleep history,

recognize signs of sleep disorders, and recommend management or referral for further evaluation and management.

Prerequisites:
SD2.In the pre-clinical/pre-clerkship curriculum the student should be introduced to basic principles of sleep physiology, sleep architecture, and circadian rhythms.
Learning Objectives:

Core By completion of the clerkship/medical school, the student will be able to:
SD3. Obtain a complete sleep history and interpret findings to formulate a differential diagnosis

SD4. Discuss the signs and symptoms of common sleep disturbances that accompany psychiatric disorders and substance use including dyssomnias and parasomnias

SD5. Discuss the effects of common psychotropic medications on sleep

SD6. Discuss the principles of sleep hygiene and how to counsel patients with sleep complaints

Learning Objectives: Enhancement

SD7. Compare and contrast the clinical features and evaluation strategies for common primary sleep disorders

SD8. Recommend management of patients with primary or secondary sleep disorders including all relevant interventions and be able to refer for specialty evaluation

Topic Area K: Personality Disorders
Rationale:
PD1. Personality Disorders are highly prevalent, chronic conditions. Patients with personality disorders present in all clinical settings and by virtue of their personality disorders are often particularly challenging and frustrating for the treating physician. Unrecognized or unaddressed personality disorders can complicate the course of any medical condition and lead to unsatisfactory

outcomes. Hence all physicians should be able to recognize signs and symptoms suggestive of personality disorders, be alert to how these disorders may complicate treatment efforts, and be able to refer patients for further evaluation and treatment.

Prerequisites:
PD2. In the pre-clinical/pre-clerkship curriculum the student should be introduced to the common neurobiological and psychological models of human development including basic principles of personality, temperament, and regression under stress.

Learning Objectives: Core

PD3.By completion of the clerkship/medical school, the student will be able to:
1. Discuss the concepts and relevance of personality traits and disorders in providing patient care

PD4. Discuss the three cluster conceptualization of personality disorders as outlined in the DSM-IV-TR and describe typical features of each disorder

PD5. Recognize and discuss common clinical features and maladaptive behaviors suggestive of a personality disorder and make recommendations for further evaluation, referral, and management

PD6. Summarize the principles of management of patients with personality disorders in any clinical setting, particularly those with the most challenging behaviors (i.e., Borderline and Antisocial), including self-awareness of one's own response to the patient, the benefit of outside consultations, the use of both support and non-punitive limit setting, and the indications for various forms of psychotherapy

Learning Objectives: Enhancement
PD7. Discuss the current understanding of interaction between heritable and environmental factors leading to the development of personality disorders

PD8. Discuss the common potential relationships between personality disorders and other psychiatric disorders (e.g., Cluster A and Psychotic Disorders, Cluster B and Mood Disorders, Cluster C and Anxiety Disorders)

PD9. Discuss the epidemiology, clinical course, prognosis, response to stress, and likely need for ongoing, long-term treatment of patients with personality disorders

Topic Area L: Disorders in Childhood and Adolescence

Rationale:
CAD1.Many psychiatric disorders are first manifested or diagnosed in infancy, childhood or adolescence. These disorders are diverse ranging from mental retardation and behavioral disturbances to mood disorders and psychosis. Children and adolescents manifesting signs and symptoms of these disorders often present in a primary care setting. Hence all physicians should be knowledgeable about child development and be able to obtain an accurate developmental history and perform an age-appropriate mental status exam as part of a thorough medical assessment. Clinicians should be able to recognize signs and symptoms suggestive of a psychiatric disorder and manage or refer patients for further evaluation and management.

Prerequisites:
CAD2. In the pre-clinical/pre-clerkship curriculum the student should be introduced to the common neurobiological and psychological models of human development, common developmental abnormalities encountered in medical practice, and the phenomenology, pathophysiology and treatment interventions for common psychiatric disorders first diagnosed in childhood and adolescence.

Learning Objectives:
CAD3.By completion of the clerkship/medical school, the student will be able to: 1. Compare and contrast the process of performing a psychiatric evaluation of children and adolescents with that of adults, including the need for systems-based assessment and treatment of children within family contexts

CAD4. Recognize and distinguish the difference between behavior that is culturally appropriate and developmentally normal from behavior that suggests psychopathology (e.g., stranger anxiety versus Panic Disorder)

CAD5. Discuss the clinical assessment and differential diagnosis for children and adolescents presenting with disruptive behavior and make recommendations for further evaluation including appropriate laboratory, imaging, psychometric and other medical testing, referral, and management

CAD6. Discuss the clinical assessment and differential diagnosis for children and adolescents presenting with developmental concerns including dysmorphia, delayed intellectual/social/motor/language skills, and/or failure to thrive and make recommendations for further evaluation including appropriate laboratory, imaging, psychometric and other medical testing, referral, and management

CAD7. Discuss the clinical assessment and differential diagnosis for children and adolescents presenting with school performance problems and make recommendations for further evaluation including appropriate laboratory, imaging, psychometric and other medical testing, referral, and management

CAD8. Discuss the epidemiology, clinical course, family history and prognosis of common psychiatric disorders in childhood and adolescence including Attention Deficit and Disruptive Behavioral Disorders, Learning Disability, Autistic Spectrum Disorders, Mood and Anxiety Disorders, Eating Disorders, and Substance Use Disorders

Rationale:
CAD9.Adjustment Disorders are clinically significant reactions to stress. Patients with adjustment disorders may present in any clinical setting in crisis with diverse symptomatology. All physicians should be able to recognize signs and symptoms suggestive of an adjustment disorder, provide support, and be able to provide or refer patients for further evaluation and crisis intervention.

Prerequisites:
CAD10. In the pre-clinical/pre-clerkship curriculum the student should be introduced to the common neurobiological and psychological models of human development, which includes concepts of personality traits, coping skills or defense mechanisms, and regression under stress.

Learning Objectives: Core
By completion of the clerkship/medical school, the student will be able to:
CAD11. Describe the essential features and course of Adjustment Disorders
CAD12. Compare and contrast Adjustment Disorders with major Mood, Anxiety and Conduct Disorders and normal Bereavement

CAD13. Recommend plans for further evaluation and management of patients diagnosed with Adjustment Disorders

Unit III: Disease Prevention, Therapeutics, and Management Topic Area A: Prevention

Rationale:
DP1.Prevention is fundamental to medical practice. Physicians must keep in mind the goals of decreasing the occurrence of illness, reducing illness duration, and minimizing the associated disability of medical conditions. Preventive medicine is a particular challenge in psychiatry where the etiology and pathophysiology of many disorders is as yet unknown and patients may lack insight into their illness.

Prerequisites:
DP2. Pre-clinical/pre-clerkship coursework in clinical epidemiology, psychopathology and normal development (including attachment theory).

Learning Objectives: Core
By completion of the clerkship/medical school, the student will be able to:
DP3. Discuss the role of parenting, families, society and elements of attachment theory in the cause and disability of psychiatric disorders
DP4. Assess the effects of socioeconomic factors (e.g., language, culture, family stability, divorce, finances, lifestyle, insurance status, poverty, etc.) on the course of psychiatric illness and adherence to treatment and counsel assigned patients and their families
DP5. Describe the genetic and environmental risk factors for psychiatric illness including emotional, physical and sexual abuse, domestic violence, and co-morbid substance abuse
DP6. Discuss the risks of untreated psychiatric illness and the importance of early identification of major psychiatric disorders in at-risk youth
DP7. Perform a behavioral health risk assessment of patients with and without established psychiatric diagnoses and identify and counsel patients regarding behavioral and lifestyle changes to promote mental health
DP8. Discuss factors that suggest need for psychiatric hospitalization and inpatient care

DP9. Provide education about psychiatric illness and treatment options to designated patients
DP10. Discuss concerns related to polypharmacy and methods to increase the safety and effectiveness of psychotropic pharmacotherapy

Topic Area B: Pharmacological Therapies
Rationale:
DP11.Knowledge of psychopharmacology is critical to the practice of all medical specialties. The field of psychopharmacology is best characterized as dynamic and the product of ongoing research and new drug development. Students must be knowledgeable about indications, contraindications, presumed mechanism of action, pharmacodynamics, pharmacokinetics, and common and serious adverse effects of psychotropic drugs. Students must also be knowledgeable about factors that will impact the use of psychotropic medications including drug-drug interactions, drug-disease interactions, and important considerations for drug use in special populations across the lifespan (e.g., children, pregnancy and lactation, the elderly). During the psychiatry clinical rotations, students should review, prioritize and update the important principles first learned in the pre-clinical pharmacology, physiology and pathology curriculum. Students should also become competent at accessing relevant information (e.g., results of large population based clinical trials, consensus algorithms, etc.) and maintaining an up-to-date knowledge base in the area of psychotropic pharmacotherapy.

Prerequisites: Pre-clinical/pre-clerkship curriculum in pharmacology, physiology and pathology.

Learning Objectives: Core
By completion of the clerkship/medical school, the student will be able to:
DP12. Discuss the common, currently available psychotropic medications with regard to clinical indications and contraindications, presumed mechanism of action and relevant pharmacodynamics, common and serious adverse effects, pharmacokinetics, evidence for efficacy, cost, risk of drug-drug interactions and drug-disease interactions, and issues relevant to use in special populations (e.g., pregnancy and lactation, childhood and adolescence, the elderly, persons using herbal and over-the-counter treatments)
DP13. Propose selected psychotropic pharmacotherapy for designated patients and provide clinical reasoning that includes discussion of factors influencing

treatment selection (e.g., patient-specific and drug-specific variables, scientific evidence)
DP14. Discuss the factors relevant to implementing, monitoring and discontinuing psychotropic pharmacotherapy including drug dosing, treatment duration, and adherence, and make management recommendations for dealing with an unsuccessful treatment trial (e.g., lack of efficacy, intolerability)
DP15. Counsel patients about psychotropic pharmacotherapy including risks and benefits of recommended treatment, treatment alternatives, and no treatment 5. Identify and discuss resources to maintain an up-to-date knowledge of psychotropic pharmacotherapy
DP16. Discuss special issues and concerns related to specific psychotropic drug classes including metabolic, hematologic, hepatic, etc.

Antidepressant Agents:
DP17.Be able to discuss the risks, early detection, relevance and interventions for adverse drug effects (e.g., seizures, electrolyte disturbance, Hyperserotonergic Syndrome, Hypertensive Crisis, suicidality, cardiac arrhythmias, etc; Antipsychotic Agents: Be able to discuss the risks, early detection, relevance and interventions for adverse drug effects (e.g., acute Extrapyramidal Side Effects/EPS, Tardive Dyskinesia, Neuroleptic Malignant Syndrome, metabolic derangements, cardiac arrhythmias, anticholinergic toxicity, etc;

Mood Stabilizing Agents:
DP18. Be able to discuss the risks, early detection, relevance and interventions for adverse drug effects of lithium, anticonvulsants, and selected antipsychotic drugs used as “mood stabilizers” (e.g., Stevens-Johnson syndrome, hepatitis, electrolyte disturbance, etc) and the relevance of laboratory tests including plasma level monitoring;

Anxiolytics and Sedative-Hypnotic Agents:
DP19. Be able to discuss the risks, early detection, relevance and interventions for drug toxicity, dependence and consequences of abrupt discontinuation;

Stimulant Agents:
DP20.Be able to discuss the risks, early detection, relevance and interventions for toxicity and abuse;
Cognitive Enhancers:
DP21. Be able to discuss the clinical use, drug interactions and potential adverse effects;

Topic Area C: Brain Stimulation Therapies
Rationale:
BS1.Electroconvulsive therapy (ECT) remains one of the most effective treatments for mood disorders. It is used widely and in many cases is considered to offer the most favorable risk: benefit ratio among available antidepressant interventions. A variety of alternative "brain stimulation therapies" are either being approved for general use to treat psychiatric disorders or are in various stages of development. Since patients with mood disorders may present in any clinical setting, all physicians should be able to refer patients for further evaluation for ECT. A knowledge of alternative brain stimulation therapies, as they become accepted for general use, is desirable.

Prerequisites: Pre-clinical/pre-clerkship coursework in neuroscience and psychopathology.
Learning Objectives: Core
By completion of the clerkship/medical school, the student will be able to:
BS2. Discuss electroconvulsive therapy (ECT) with regard to clinical indications and contraindications, presumed mechanism of action, common and serious adverse effects, evidence for efficacy, cost, and issues relevant to use in special populations (e.g., pregnancy, childhood and adolescence, the elderly)

Learning Objectives: Enhancement
BS3. Discuss alternative forms of electromagnetic brain stimulation therapy including Light Therapy, Vagal Nerve Stimulation (VNS), and those treatments for psychiatric disorders that are in various stages of development such as Repetitive Transcranial Magnetic Stimulation (rTMS), Deep Brain Stimulation (DBS), etc

Topic Area D: Psychotherapies
Rationale:
PT1.Evidence-based interventions for many disorders encountered in medical practice include psychotherapy. Although a psychiatry clerkship does not provide adequate time for a student to learn to conduct psychotherapy, it does present an opportunity for students to gain familiarity with and develop an understanding of psychotherapy. At the most essential level, psychotherapy is the process of helping people overcome problems by talking about them. There are many types of psychotherapy, each with a theoretical construct that aims to help us understand human behavior and treat disturbances of emotion and

behavior. Regardless of medical specialty, an effective practitioner should have a basic understanding of psychotherapy, recognize the relevance of psychotherapy principles to the doctor-patient relationship, be aware of those psychotherapies with evidence-based efficacy for particular disorders, and be able to refer patients for psychotherapy.

Prerequisites:
PT2.In the pre-clinical/pre-clerkship curriculum, the student should be introduced to basic principles of the behavioral and social sciences including psychodynamic theory, learning theory, human development, and the complexity of the physician-patient relationship.

Learning Objectives: Core
By completion of the clerkship/medical school, the student will be able to:
PT3. Discuss general features of common psychotherapies and recommend specific psychotherapy for designated patients in conjunction with or instead of other forms of treatment and provide clinical reasoning that includes discussion of factors influencing treatment selection (e.g., patient-specific and treatment-specific variables, scientific evidence)
PT4. Counsel patients, promote the use of healthy coping strategies, provide education about psychotherapy and make appropriate referral for this modality of treatment
PT5. Identify and discuss the relevance of potential levels of verbal and non-verbal communication occurring in the uniquely intimate relationship between doctor and patient that occurs regardless of the medical setting or type of medical care being provided including therapeutic boundaries, therapeutic stance, therapeutic alliance, transference and countertransference

Learning Objectives: Enhancement
PT6. Discuss the relevance, basic principles, and approaches for the use of behavioral medicine across medical specialties including promotion of behavioral change, processing patient reactions to illness, assessing family dynamics, etc.
PT7. Discuss the concept of evidence-based treatment as it applies to psychotherapies and psychosocial interventions citing current examples
PT8. Discuss the range of psychotherapeutic approaches to treating children in family contexts, including Cognitive Behavioral Therapy, parent education, play therapy, marital and family therapy, etc
PT9. Discuss the range of psychotherapeutic approaches with regard to the treatment of individuals and families from diverse cultural backgrounds

Topic Area E: Multidisciplinary Treatment Planning and Collaborative Management

Rationale:

MT1.Regardless of medical specialty, because of the complexity of our healthcare system, the complexity of peoples' lives, and the impact of psychosocial variables on health and illness, it is critical that a physician be able to collaborate effectively with other physicians in different specialties and with other healthcare workers in different disciplines. The effective collaborations necessary to bring about an optimal clinical outcome require an understanding and appreciation of what each discipline contributes to patient care. An effective physician recognizes the importance of collaboration with the patient's family and others in their life to increase the likelihood of a successful treatment outcome. Prerequisites: In the pre-clinical/pre-clerkship curriculum students should be introduced to the roles played by non-physician healthcare professionals, the concept of multidisciplinary treatment planning, and the relevance of communication with patient's families.

Learning Objectives: Core

By completion of the clerkship/medical school, the student will be able to:

MT2. Discuss the roles of different physician specialties and non-physician healthcare disciplines (e.g., case managers, addiction counselors, interpreters, cultural liaisons, etc), demonstrate respect for these colleagues, and work collaboratively in the care of patients and their families

MT3. Discuss the importance of working successfully with patient's families and other agencies in the patient's life (e.g., schools, employers, etc) accounting for cultural diversity, to bring about an optimal clinical outcome

MT4. Discuss indications for psychiatric consultation and how to appropriately request and respond to such a consultation

MT5. Discuss and propose appropriate community resources as part of a comprehensive treatment plan for assigned patients (e.g., support groups, residential facilities, vocational rehabilitation, etc)

MT6. Discuss the impact of mental illness on access to appropriate healthcare and make recommendations for addressing these issues in planning treatment for assigned patients

Topic Area F: Complementary and Alternative Treatments

Rationale:
CAT1.The use of interventions commonly referred to as Complementary and Alternative treatment modalities (CAM) are very popular in are present society and their use crosses all cultures and age groups. These CAM are diverse, ranging from acupuncture, massage, body work and exercise to vitamins and herbal supplements. Some are evidence-based. Many are not without potential adverse effects and may interact with conventional medical treatments. Hence all patient evaluations should include inquiry about the use of CAM.

Prerequisites:
CAT2.The pre-clinical/pre-clerkship curriculum should include an introduction to the popularity of CAM in our society and pharmacology coursework should include discussion of commonly used supplements.

Learning Objectives: Core
By completion of the clerkship/medical school, the student will be able to:
CAT3. Discuss the popular use of Complementary and Alternative Modalities (CAM) of treatment and gather and analyze this information when performing a psychiatric evaluation

Learning Objectives: Enhancement
CAT4. Discuss and recommend integration of CAM therapies that have an evidence-base (e.g., light therapy for seasonal affective disorder, T'ai Chi for improving balance in elderly patients, etc.)

Unit IV: Professionalism, Ethics and the Law Topic Area A: Professionalism
Rationale:

EL1.Professionalism is a broadly defined, critical component of medical practice and should be fundamentally present in all clerkship curricula and throughout undergraduate medical education. Elements of professionalism include integrity, honesty, responsibility, dedication to the best interests of the patient, and sensitivity to the diversity of patients and their disabilities. Physician effectiveness, patient safety, and quality health care require a high level of professionalism.

Prerequisites:
EL2. Elements of professionalism should be introduced and explicitly discussed throughout the pre-clinical/pre-clerkship curriculum.

Learning Objectives: Core
By completion of the clerkship/medical school, the student will be able to:
EL3. Identify and account for personal emotional responses to patients
EL4. Demonstrate respect, empathy, responsiveness, and concern regardless of the patient's problems, personal characteristics, or cultural background
EL5. Demonstrate sensitivity to medical student-patient similarities and differences in gender, cultural background, sexual orientation, socioeconomic status, level of disability, educational level, political views, and personality traits
EL6. Discuss the prevalence and barriers to recognition of psychiatric illnesses in general medical settings and recognition of general medical conditions in patients with known psychiatric illness
EL7. Discuss the physician's role in advocacy for services for the mentally ill
EL8. Discuss the concept of boundaries in the doctor-patient relationship and boundary violations
EL9. Demonstrate integrity, responsibility and accountability in the care of assigned patients
EL10. Demonstrate scholarship in the form of contributing to a positive learning environment, collaborating with colleagues, and performing self-assessment and self-directed learning
EL11. Be able to assess one's strengths, weaknesses and health (physical and emotional), and be willing to seek and accept supervision and constructive feedback

Topic Area B: Medical Ethics
Rationale:
ME1. All physicians confront ethical issues in medical practice. In caring for patients with altered mental status, physicians must deal with the conflict between beneficence and autonomy, psychological development and personal history in the lives of patients. In caring for patients with significant emotional disturbance, a physician must refrain from rejecting a patient or getting over involved. A thorough understanding of the ethical issues of confidentiality, informed consent, caring for special populations and the right to refuse treatment is critical to appropriate clinical practice. For clinical excellence, a physician must be able to identify ethical features in a patient's care, utilize

self-observation and self-scrutiny, and implement focused strategies for approaching ethical issues.

Prerequisites:
ME2. Introduction to ethical issues in medicine throughout the pre-clinical/pre-clerkship curriculum.

Learning Objectives: Core
By completion of the clerkship/medical school, the student will be able to:
ME3. Identify and discuss issues of ethical concern in the care of assigned patients (e.g., autonomy versus beneficence and interpersonal boundaries) (See IV.C. Medical-Legal Issues)
ME4. Identify and discuss ethically risky and problematic situations encountered in healthcare (e.g., duty to warn, reporting child abuse)

Learning Objectives: Enhancements
ME5. Discuss how one's own life story, attitudes, and knowledge may influence care of assigned patients
ME6. Identify and describe one's area of clinical competence, working within those boundaries, and when to seek consultation

Topic Area C: Medical-Legal Issues in Psychiatry
Rationale:

ML1.All physicians must be knowledgeable about the legal obligations associated with medical practice. Important legal obligations for physicians include duty to report, duty to warn, and least restrictive alternative treatments. Particularly relevant in psychiatry are the issues of involuntary commitment, assessment of competency, seclusion and restraints, and criminal responsibility.

Prerequisites:
ML2.Introduction to the interaction of healthcare, legal and court systems throughout the pre-clinical/pre-clerkship curriculum.

Learning Objectives: Core

By completion of the clerkship/medical school, the student will be able to:

ML3. Discuss the risk factors, screening methods and reporting requirements for suspected abuse, neglect and domestic violence in vulnerable populations including children, adults, and the elderly
ML4. Discuss the physician's role in screening for, diagnosing, reporting and managing victims of abuse
ML5. Discuss the principles, process and physician's role in civil commitment, recognizing that there are variations in state law, and the implications of voluntary versus involuntary status of a patient
ML6. Discuss the elements of informed consent and evaluation of decision-making capacity (i.e., the right to refuse treatment, assent versus consent in children and adolescents)
ML7. Discuss the principles and process of the physicians "duty to warn" obligation
ML8. Discuss and give examples of when confidentiality may be breached including when treating children and adolescents

Topic Area D: Cultural Competence and Mental Health Disparities
Rationale:
MHD1.Culture influences how individuals experience, attribute meaning to, and communicate about illness. Discrimination and bias contribute to treatment inequality leading to mental health and mental health care disparities. Physicians need to practice in a culturally competent manner in order to adequately address the general health and mental health needs of our increasingly culturally diverse communities.

Prerequisites:
MHD2.Elements of cultural competence should be introduced and explicitly discussed throughout the pre-clinical/pre-clerkship curriculum.

Learning Objectives: Core
By completion of the clerkship/medical school, the student will be able to:
MHD3. Discuss the mental health and mental health care disparities experienced by racial and ethnic groups and the factors that contribute to them

MHD4. Discuss how to elicit the cultural beliefs, preferences and practices that are relevant to making diagnostic assessments and treatment recommendations utilizing various resources (e.g., the patient, family, cultural experts, written literature, etc.)
MHD5. Collect and incorporate cultural information in the assessment and treatment planning of assigned patients while avoiding stereotyping
MHD6. Identify and account for stereotypes, personal bias and prejudices towards patients from various cultural groups

Learning Objectives: Enhancement
MHD7. Discuss the culture of psychiatry and medicine including its history of bias and discrimination towards underrepresented groups (e.g., ethnic and sexual minorities)
MHD8. Describe and incorporate the five elements of the DSM-IV-TR Outline for Cultural Formulation in the assessment of assigned patients

PSYCHIATRY COURSE OUTCOME

Learning outcomes (LOs):

Having completed a course in psychiatry, the student will be able to:

CO1. **PATIENT CARE (PC)**

a.Communicate effectively and demonstrate caring and respectful behaviors
b.Gather essential and accurate information about assigned patients
c.Make informed decisions about diagnostic and therapeutic interventions based on patient information and preferences, up-to-date scientific evidence, and clinical judgment
d.Develop, recommend and/or carry out under supervision patient management plans
e.Counsel and educate patients and their families
f.Recommend and/or perform under supervision essential examinations and procedures
g.Provide health care services aimed at preventing health problems or maintaining health
h.Work within a team of health care professionals, including those from other disciplines, to provide patient-focused care

CO2. MEDICAL KNOWLEDGE(MK)

a.Demonstrate an investigative and analytic thinking approach to clinical situations
b.Be able to discuss and apply the basic and clinically supportive sciences

CO3. PRACTICE-BASED LEARNING AND IMPROVEMENT (PBI)

a.Analyze practice experience and perform practice-based improvement activities
b.Locate, appraise, and assimilate evidence from scientific studies related to assigned patients and patient populations
c.Apply knowledge of study designs and statistical methods to the appraisal of clinical studies and other information on diagnostic and therapeutic effectiveness
d.Use information technology to manage information, access on-line medical information; and support their own education
e.Facilitate the learning of other health care professionals

CO4. INTERPERSONAL AND COMMUNICATION SKILLS (CS)

a.Create and sustain a therapeutic and ethically sound relationship with patients b.Use effective listening skills and elicit and provide information using effective nonverbal, explanatory, questioning, and writing skills

CO5. PROFESSIONALISM (P)

a.Demonstrate respect, compassion, and integrity; a responsiveness to the needs of patients and society that supercedes self-interest; accountability to patients, society, and the profession; and a commitment to excellence and on-going professional development
b.Demonstrate a commitment to ethical principles pertaining to provision or withholding of clinical care, confidentiality of patient information, informed consent, and business practices
c.Demonstrate sensitivity and responsiveness to patients' culture, age, gender, and disabilities

CO6. SYSTEMS-BASED PRACTICE (SBP)

a.Discuss the interactions of their patient care with other health care professionals, health care organizations, and the larger society
b.Explain how types of medical practice and delivery systems differ from one another, including methods of controlling health care costs and allocating resources
c.Recommend and/or practice cost-effective health care and resource allocation that does not compromise quality of care
d.Advocate for quality patient care and assist patients in dealing with system complexities.
e.Discuss how to partner with health care managers and health care providers to assess, coordinate, and improve health care and know how these activities can affect system performance

COURSE MAPPING

Course Mapping with program objectives

Program Outcomes

At the end of the M.B.B.S training program the students should have the requisite knowledge, skills, attitude, values and responsiveness so that they may function appropropriately and effectively as a basic doctor, Physicians of first contact for the community in the primary care setting both in urban as well as rural areas of our country

To fulfill these objectives the doctor must be able to function appropriately and effectively in the following roles

PO1.Clinician who understands and provides preventive ,promotive,curative ,palliative and holistic care with compassion

PO2.Leader and member of the health care team and system with capabilities to collect, analyse and synthesize health data

PO3.Communicator with patients, families, colleagues and community

PO4.Lifelong learner committed to continuous improvement of skills and knowledge

PO5.Professional who is committed to excellence is ethical, responsive and accountable to patients , community and profession

Psychiatry Course Goals

CG1.Residents must be able to provide patient care that is compassionate ,appropriate and effective for the treatment of health problems and the promotion of health
CG2.To understand the patient doctor relationship
CG3.Residents are expected to develop and demonstrate skills and habits
CG4.To communicate effectively with patients, physician and health care professionals
CG5.To carry out professional responsibilities and an adherence to ethical principles and to maintain high standards of ethical behavior which includes respect for patient privacy and autonomy

CG6.To work effectively in various health care delivery settings

Mapping of Course outcome with goals

Course outcomes	Course goals
CO1.Patient care	CG1,CG6
CO2. Medical knowledge	CG2,CG3,CG6
CO3. Practice-Based Learning And Improvement	CG3,CG5,CG6
CO4.Interpersonal and communication skills	CG4,,CG6
CO5.Professionalism	CG5,CG6
CO6.System based practice	CG5,CG6

Mapping course outcomes with program outcomes

		PE0s				
		PO1	PO2	PO3	PO4	PO5
Course outcome	CO1	x	x			
	CO2		x			
	CO3				x	x
	CO4			x	x	
	CO5	x	x	x	x	x
	CO6	x	x	x	x	x

Class Timetable

Day	8.00 am -9.00am	9.00am -12.00 noon	12.00 noon -1pm	1.00pm -2.00pm	2.00pm-3.00pm	3.00pm-4.00pm
Monday	Ortho	Clinical posting opd &ward rotation	Lunch	General Medicine	General surgery	1st week &2nd week Chest & TB 3rd week Anesthesia 4th week Radiology
Tuesday	Obg	Clinical posting opd &ward rotation	Lunch	General surgery	Obg	Pediatrics
Wednesday	Pediatrics	Clinical posting opd &ward rotation	Lunch	Obg	Symposium & seminar (1st week Obg &cm 2nd week Gen. Medicine& Allied 3rd week gen Surgery &its Allied. 4th week rotation)	
Thursday	General medicine	Clinical posting opd &ward rotation	Lunch	General surgery	General medicine	1-3rd week Derma 4th week Dental
Friday	General medicine	Clinical posting opd &ward rotation	Lunch	Obg	Ortho	1stweek &2nd week psychiatry,3rd week anaesthesia,4th week radiology
Saturday	General surgery	Clinical posting opd &ward rotation	Lunch	Examination on rotation basis 1st week med& allied. 3rd week General Surgery & allied ,4th week Obg &cm		

INDIVIDUAL TIMETABLE

Day	8.00 am -9.00am	9.00am -12.00 noon	12.00 noon -1pm	1.00pm -2.00pm	2.00pm-3.00pm	3.00pm-4.00pm
Monday		Clinical posting opd &ward rotation	Lunch			
Tuesday		Clinical posting opd &ward rotation	Lunch			
Wednesday		Clinical posting opd &ward rotation	Lunch		Symposium & seminar (1st week Obg &cm 2nd week Gen. Medicine& Allied 3rd week gen Surgery &its Allied. 4th week rotation)	
Thursday		Clinical posting opd &ward rotation	Lunch			
Friday		Clinical posting opd &ward rotation	Lunch			1stweek &2nd week psychiatry,3rd week anaesthesia,4th week radiology
Saturday		Clinical posting opd &ward rotation	Lunch			

Psychiatry Lecture Topic – Jan 2019 to Dec 2019

Final year MBBS students

Date	Topic	Faculty
03/01/19	History of psychiatry Mental illness and treatment	Dr. V. Ramanujam
11/01/19	Concept of mental health Vs mental illness, Normality vs abnormality	Dr. Rena
05/02/19	Psychopathology	Dr.Vidhya
14/02/19	Anxiety disorders	Dr.Rena
04/03/19	Suicide/para suicide	Dr. Sugaparaneetharan
13/03/19	Psychopharmacology and somatic treatments	Dr. V. Ramanujam
03/04/19	Personality disorders	Dr. Rena
13/04/19	Childhood psychiatric disorders part 1	Dr.Vidhya
02/05/19	Geriatric psychiatry	Dr. Sugaparaneetharan
15/05/19	Forensic psychiatry	Dr. V. Ramanujam
04/06/19	Schizophrenia	Dr.Rena
17/06/19	Somatoform, Dissociative, Factitious disorder	Dr.Vidhya
04/07/19	Principles of Learning, memory	Dr. Sugaparaneetharan
16/07/19	Other drug use disorders	Dr. V. Ramanujam
03/08/19	Classification of mental illness	Dr. Rena
16/08/19	Psychiatric emergencies	Dr. Sugaparaneetharan
02/09/19	Mood disorders	Dr.Rena
10/09/19	Childhood psychiatric disorders part 2	Dr.Vidhya
02/10/19	Organic psychiatric disorders	Dr. V. Ramanujam
16/10/19	Classification of mental illness	Dr. Rena
01/11/19	Alcohol use disorders	Dr. V. Ramanujam
12/11/19	Child & adolescent psychiatry	Dr.Vidhya
04/12/19	Uncommon psychiatric syndrome	Dr. Rena
16/12/19	Somatoform Disorders	Dr. V. Ramanujam

Lecture Schedule
And
Methodology

S.NO	NAME OF LECTURE	TEACHING LEARNING METHOD	ASSESSMENT METHOD
1.	**Doctor patient relationship:** Establish rapport and describe components of communication	Bedside clinics	Faculty observation and viva voce
	Doctor patient relationship : Demonstrate communication skills and importamnce of confidentiality	Direct observation	Faculty observation and viva voce
2	**Mental health – 1** Describe components of stress and positive psychology	Lecture, Small group discussion	Written/ Viva voce
	Mental Health – 2 Describe theories of learning, memory and motivation and diffference between normality and abnormality.	Lecture, Small group discussion	Written/ Viva voce
3	**Introduction to psychiatry -1** Enumerate symptoms and signs in mental illneses and describe pathological and neurobiological basis of diseases.	Lecture, Small group discussion	Written/ Viva voce
	Introduction to psychiatry -2 Enumerate and describe the pharmacologic basis and side effects of drugs used in psychiatric disorders.	Lecture,Bedside clinics	Written/ Viva voce
	Introduction to psychiatry -3 Describe, discuss and distinguish psychotic & non-psychotic group (Mood, Anxiety, Stress related) disorders	Lecture,Bedside clinics, small group discussion	Written/ Viva voce
4	**Substance use disorders – 1** Elicit, describe and document clinical features of alcohol and substance use disorders	SGD, Bedside clinics	Written/ Viva voce
	Substance use disorders – 2 Enumerate and describe the indications and interpret laboratory andm other tests used in alcohol and substance abuse disorders.Describe the treatment of alcohol and substance abuse disorders including behavioural and pharmacologic therapy	SGD, Bedside clinics , Direct Observation	Written/ Viva voce
5	**Psychotic disorders -1** Classify and describe the magnitude and etiology and clinical features of schizophrenia & other psychotic disorders	Lecture, Small group discussion, Bedside clinics	Written/ Viva voce
	Psychotic disorders – 2 Describe the treatment of schizophrenia including behavioural and	Small Group Discussion, Bedside clinics	Written/ Viva voce

	pharmacologic therapy		
6	**Mood disorders** Classify and describe the magnitude and etiology,clinical features of depression and describe the pharmacological and non pharmacological managemnet of Depression. Classify and describe the magnitude and etiology,clinical features of Bipoalr disorder and describe the pharmacological and non pharmacological managemnet of Bipoalr disorder.	Lecture, Small Group Discussion, Bedside clinics	Written/ Viva voce
6	**Anxiety disorders** Classify and describe the magnitude and etiology, clinical features of Anxiety disorders and describe the pharmacological and non pharmacological managemnet of Anxiety disorders.	SGD, Bedside clinics	Written/ Viva voce
7	**Stress related disorders** Classify and describe the magnitude and etiology, clinical features of Stress related disorders and describe the pharmacological and non pharmacological managemnet of Stress related disorders.	SGD, Bedside clinics	Written/ Viva voce
8	**Somatoform disorders** Classify and describe the magnitude and etiology, clinical features of Somatoform disorders and describe the pharmacological and non pharmacological managemnet of Somatoform disorders	SGD, Bedside clinics	Written/ Viva voce
9	**Personality Disorders** Classify and describe the magnitude and etiology, clinical features of Somatoform disorders and describe the pharmacological and non pharmacological managemnet of Somatoform disorders	SGD	Written/ Viva voce
10	**Psychosomatic disorders** Classify and describe the magnitude and etiology, clinical features of Psychosomatic disorders and describe the pharmacological and non pharmacological managemnet of Psychosomatic disorders.	Bedside clinics,lecture	Written/ Viva voce
11	**Psychiatric disorders in childhood**	SGD, Bedside	Written/ Viva voce

	and adolescence – 1 Classify and describe the magnitude and etiology, clinical features of Psychiatric disorders in childhood and adolescence.	clinics,lecture	
	Psychiatric disorders in childhood and adolescence – 2 describe the pharmacological and non pharmacological managemnet of Psychiatric disorders in childhood and adolescence	SGD, Bedside clinics,lecture	Written/ Viva voce
12	**Mental retardation** Classify and describe the magnitude and etiology, clinical features of Mental retardation and describe the pharmacological and non pharmacological managemnet of Mental retardation.	Lecture,Bedside clinics	Written/ Viva voce
13	**Psychiatric disorders in the elderly** Classify and describe the magnitude and etiology, clinical features of Psychiatric disorders in the elderly and describe the pharmacological and non pharmacological managemnet of Psychiatric disorders in the elderly.	SGD, Bedside clinics	Written/ Viva voce
14	**Psychiatric emergencies – 1** Enumerate and describe the recognition and clinical presentation of psychiatric emergencies (Suicide, Deliberate Self Harm, Violent behaviour)	Lecture, SGD	Written/ Viva voce
	Psychiatric emergencies – 2 Describe the initial stabilisation and management of psychiatric emergencies with specialist referral.	Lecture, SGD	Written/ Viva voce
15	**Therapeutics – 1** Enumerate the indications and describe the pharmacology, dose and side effects of commonly use drugs in psychiatric disorders Enumerate the indications for modified electroconvulsive therapy	Lecture,SGD	Written/ Viva voce
	Therapeutics – 2 Enumerate and describe the principles and role of psychosocial interventions in psychiatric illness including psychotherapy, behavioural therapy and rehabilitation.	Lecture,Bedside clinics	Written/ Viva voce
16	**Psychosexual and gender -identity**	Lecture,SGD	Written/ Viva voce

	disorders: Classify and describe the magnitude and etiology, clinical features of Psychosexual and gender -identity disorders: and describe the pharmacological and non pharmacological managemnet of Psychosexual and gender -identity disorders:		
17	**Miscellaneous – 1** Describe the relevance, role and status of community psychiatry Describe the objectives strategies and contents of the National Mental health program. Enumerate and describe the salient features of the prevalent mental health laws in India Describe the concept principles of preventive and mental health promotion (positive mental health); and community education	Lecture,SGD	Written/ Viva voce
	Miscellaneous – 2 Describe and discuss the basic legal and ethical issues in psychiatry. Enumerate and describe the identifying features and the principles of participatory management of mental illness occurring during and after disasters	Lecture,SGD,	Written/ Viva voce

UNIVERSITY QUESTIONS

[LO 552] **FEBRUARY 2019** Sub.Code :5082

M.B.B.S. DEGREE EXAMINATION
THIRD YEAR
PART II
PAPER II - GENERAL MEDICINE (INCLUDING PSYCHIATRY, DERMATOLOGY AND S.T.D.)

Q.P. Code: 525082

Time: Three hours **Maximum : 60 Marks**

Answer All Questions

I. Elaborate on: **(2+2+2+4 = 10)**

1. Discuss etiology, pathogenesis, clinical features and management of multiple sclerosis.

(2+2+2+4 = 10)

2. Describe the etiology, clinical features, complication and management of bipolar disorder.

II. Write notes on: **(6 x 5 = 30)**

1. Good Pastures disease.
2. Pellagra.
3. Angioplasty and intra coronary stents.
4. Glycosylated Haemoglobin (HbA1C).
5. Catatonia.
6. Discoid lupus erythematosus.

III. Short answers on: **(5 x 2 = 10)**

1. Four hazards of alcohol.
2. Four highly active anti retroviral therapy drugs.
3. Four diagnostic criteria of rheumatoid arthritis.
4. Four causes of neck pain.
5. Four causes of gout.

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[LP 552] **AUGUST 2019** Sub.Code :5082

M.B.B.S. DEGREE EXAMINATION
THIRD YEAR
PART II
PAPER II - GENERAL MEDICINE (INCLUDING PSYCHIATRY, DERMATOLOGY AND S.T.D.)

Q.P. Code: 525082

Time: Three hours **Maximum : 60 Marks**

Answer All Questions

I. Elaborate on: **(2+1+2+2+1+2 = 10)**

1. Define thyrotoxicosis. Discuss epidemiology, pathophysiology, clinical features and diagnosis of Grave's diseases. Add a note on treatment of Grave's disease.

(2+2+1+2+1+2 = 10)

2. Define Cerebro Vascular accident (CVA). Classify CVA. Discuss pathophysiology, clinical features and diagnosis of acute ischemic stroke. Write about complications of acute ischemic stroke.

II. Write notes on: **(6 x 5 = 30)**

1. Paracetamol poisoning.
2. Osteoporosis.
3. Herpes zoster.
4. Haemolytic Uremic Syndrome (HUS).
5. Panic disorders.
6. Investigations and management of acute pancreatitis.

III. Short answers on: **(5 x 2 = 10)**

1. Four drugs to treat systemic lupus erythematosus.
2. Four causes of bullous lesions.
3. Four complications of obesity.
4. Four drugs to treat schizophrenia.
5. Four drugs to treat mood disorders.

QUESTION BANK

Essay

Describe the approach to clinical recognition and initial therapy of psychiatric emergencies

Define somatoform disorders. Discuss the Aetiology, clinical features of various somatoform disorders and their management

Define various personality disorders. Discuss the etiology, clinical features and management of

personality disorders

Eating disorders

Classify the etiology, clinical features and management of stress-related disorders

Define Bipolar disorders - discuss the etiology, v clinical features of various mood disorders and

their management(2)

Manic depressive psychosis

Mood disorders (2)

V Alcohol dependence (2)

Schizophrenia (6)

Short notes

Auditory hallucination

General paralysis of insane

Contraindications of ECT

Obsession

v Suicidal behaviour Electro convulsive therapy

Panic attacks

Panic disorders (2) v TCA

Catatonia (2)

Phenothiazine's

Anorexia Nervosa

Chronic fatigue syndrome V

Psychogeriatrics Personality

disorders Eating disorders

Neuroleptic malignant syndrome
Classification of psychogenic drugs

Puerperal psychosis

Selective serotonin reuptake inhibitors (SSRI) V

Neurosis Vs Psychosis

Delusions (3)

Manic depressive psychosis (2)

Delirium tremens (2)

OCD (3)
Hysteria (3)

Anxiety Neurosis (4)

Depression (7)

Schizophrenia (9)

Short answers

Obsessive compulsive disorder Four

drugs to treat schizophrenia Four

drugs to treat mood disorders

Catatonia

List four criteria for alcoholic dependence V

Four hazards of alcohol

Any two phenothiazine group of drugs

Four clinical features of alcohol dependence syndrome

LIST OF REFERENCES

REFERENCES

Books Recommended:

Comprehensive text book of Psychiatry, SADOCK (B J) and SADOCK (V A)
Oxford text book of Psychiatry .GELDER M etal,
KALPAN (H I) and SADOCK (B J) Synopsis of text book of Psychiatry,
LISHMAN (W A), Organic Psychiatric: a text book of neuropsychiatry,
Introduction to Psychology by Morgon and King
Rutter's Child and Adolescent Psychiatry
Stahl's Essential Psychopharmacology
Text Book of Forensic Psychiatry by Robert I. Simon and Liza H. Gold
Research Methodology by C. R. Kothari
Statistics by Hennery E. Garrett and S.K. Mangal
Fish's Textbook of Psychopathology

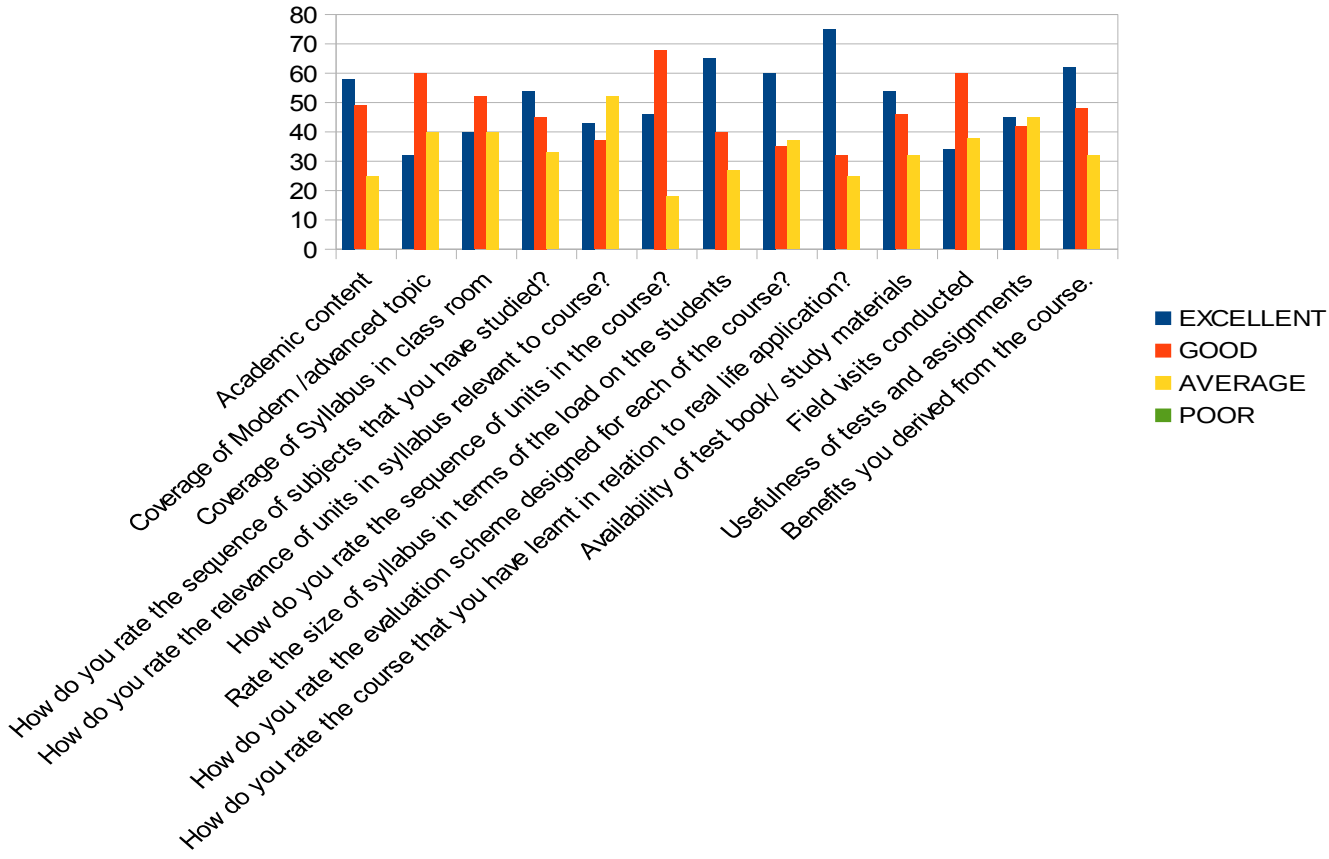
Journals

1.Indian Journal of Psychiatry
2.Indian Journal of Medical Research
3.American Journal of Psychiatry
4.Archives of general Psychiatry
5.British Journal of Psychiatry
6.Lancet
7.New England Journal of Medicine
8.Indian Journal of Clinical Psychology
9.NIMHANS Journal
10. Acta Psychiatrica Scandinavia
11. Indian Journal of Psychological Medicine

QUALITY MEASUREMENTS

VELAMMAL MEDICAL COLLEGE HOSPITAL AND RESEARCH INSTITUTE,MADURAI
STUDENT FEEDBACK FORM FINAL MBBS
DEPARTMENT OF PSYCHIATRY
MBBS BATCH 2015,FINAL YEAR

RESPONSE: 90/143



LIST OF STUDENTS

Sl.no	Name of the student	Sl.no	Name of the student
1	RAMANA DEVI R	72	MONISHA A
2	VISHWANATHAN V	73	NANDHAKUMARAN P
3	SABARI RAJAN V K	74	NANTHINI N
4	AAMIR AHAMEDSHERFUDEEN M	75	NARAYANAN A
5	AARTHI C K	76	NILAA RAJESWARI M
6	ABINAYA G	77	NIRMAL S
7	ABINAYA N K	78	PAVITHRA A
8	ABINAYA R	79	PERIYAGANESH G B
9	ABISHEK PRINCE M	80	POOJA SWETHA P
10	AHAMED MUNSHIRA A S	81	PRABHAKARAN R
11	AJAY SRINIVAS S S	82	PRABHAKARAN V
12	AJEETHA KODI C	83	PRADEEP K
13	AKSHAYA K	84	PRADEEP S
14	AKSHAYA SIDDESHWAR D	85	PRIYADHARSHINI B
15	AMALA SHERIN VICTOR	86	PRIYADHARSHINI S
16	ANGELIN ANIRUTHA R	87	RAAGAVE K
17	ANISHA R	88	RAJA PRAVEENA P S
18	ANUSIYA E	89	RAJALAKSHMI S
19	ARAVINDH D G	90	RAMAGOPALAN S
20	ARUL NIVI P	91	RASHEEDA A
21	ARUL RANI R	92	RENUKA VARSHINI V
22	ARUNKUMAR K B	93	RESHMI E
23	ASHA DEVI A	94	ROHINI S
24	BALAMURALIKRISHNA M	95	ROSHINI V
25	BHARAT KRISHNA M	96	SAARIKA N
26	CHRISTINAJASMINE C	97	SAKTHIVEL A
27	DEEPA M	98	SANJAIKUMAR V
28	DEEPAPRIYA B	99	SANJAY KUMAR R
29	DEREK JONATHAN EDWIN R	100	SANTHOSH KUMAR M
30	DEV DANIEL K	101	SANTHOSHI M

31	DHANYA MEENU S K	102	SARANYA A
32	DHARANI P	103	SARVAISHVARYA B
33	DHARSHINI V	104	SATYA B
34	DHIVYA PRIYADHARSHINI C	105	SHAFANA NASREEN H
35	DINESH R	106	SHANKAVI G
36	DIVYA T	107	SHARAN BOSE
37	ELAMUGILAN E	108	SHENENDHRA SELVARAJ
38	ESWAR R R	109	SHERON MARY IGNATIUS R E
39	GAYATHRI J	110	SHIVANI N
40	GEORGE ANDREW JEYAPANDIAN J	111	SHRUTHI J
41	GOKULA KRISHNAN G	112	SIDDARTH V
42	GOLDWIN SHELTON K	113	SIDDHARTHAN N
43	HARI PRABHAKAR K	114	SIVA KUMAR S
44	HARIDHARAN V	115	SIVARANJANI P
45	HARISH S L	116	SOWBARNIKA G
46	HARSHA S S	117	SOWMYA P
47	HARSHEETHA R	118	SRIJAA S
48	HARSHINI A	119	SRUSHIKESH M
49	HARSHITHA KONANKI	120	SUBASHINI I
50	JAISHREE S M	121	SUBASREE N
51	JANANI D	122	SUBHA LAKSHMI S
52	JEGATHEESWARAN M	123	SUGANDHAPRAKAUSH S
53	JESICA S	124	SUNPRAKATHI A P
54	KARTHIKA C	125	SUSHMITA V
55	KAVILAKSHMANAN R	126	SWATHY A
56	KAVINILA S	127	TAMIZHINIYAN S
57	KAYATHRI M	128	THANKALESHMI P
58	KEERTHANA K S	129	VAIKUNTHNATHAN S R
59	KEERTHI MEENA M	130	VAISHNAVI S
60	KRITHIKA LAKSHMI S M	131	VAISHNOVA DEVI U
61	MADHAN V	132	VARSHIKA K

62	MADHUBALA V	133	VARSHINI R V
63	MADHUMITHA E	134	VASANTH K
64	MADHUMITHA G	135	VIBU SUDHAN A
65	MANO NANDHINI M	136	VIGNESHWARAN T
66	MATHAVA KUMAR V	137	VINITHA P
67	MATHIYAZHAGAN B	138	VISHNU SHANTHINI B
68	MIRTHULAKUMAR S	139	VISWANATHAN C
69	MOHAMED JAAVIDH A	140	VIZHAMALAR A
70	MOHAMED RAYEEZ A	141	YOGITHA P
71	MOHAMED YUNUS F	142	YOKESH A

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