SACRED HEART COLLEGE (AUTONOMOUS)

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Ready for Every Good Work

A Don Bosco Institution of Higher Education, Founded in 1951 * Affiliated to Thiruvalluvar University, Vellore * Autonomous since 1987

Accredited by NAAC (4th Cycle – under RAF) with CGPA of 3.31 / 4 at 'A+' Grade

PG & Research Department of Biochemistry Sacred Heart College (Autonomous), Tirupattur Dt.

PGDMLT COURSE SYLLABUS

UNDER CBCS (With effect from 2021-2022)

PROGRAMME STRUCTURE

Sem	Sub Code	Paper	Title of the Paper	Ins. Hrs/ Week	Cr	Exam Hrs	Max. Marks		
							CA	Sem	Tot
I SEMESTER	BCD109	Core Paper I	General Laboratory and Instruments Maintenance	5	4	3	50	50	100
	BCD110	Core Paper II	Haematology& Blood Banking	5	4	3	50	50	100
	BCD111	Core Paper III	Microbiology	5	4	3	50	50	100
	BCD112	Core Paper IV	Clinical Biochemistry	5	4	3	50	50	100
	PBCD105	Core Practical I	Lab Course I - Haematology & Microbiology	5	4	6	50	50	100
	PBCD106	Core Practical II	Lab Course II - Diagnostic Biochemistry	5	4	6	50	50	100
				30	**24**				**600**
II SEMESTER	BCD209	Core Paper V	Advanced Molecular Laboratory Technology	5	4	3	50	50	100
	BCD210	Core Paper VI	Human Pathogens & Body Fluid Analysis	5	4	3	50	50	100

	PBCD205	Core Practical III	Lab Course III - Urine Analysis and Stool examination	5	4	6	50	50	100
	PBCD206 J	Core Paper VII	Internship	13	8	-	50	50	100
	VE804		Human Rights	2	1	-	100	-	100
				30	**21**				**500**
				60	**45**				**1100**

Regulation for Theory Courses

Evaluation Scheme for Continuous Assessment [50 Marks]

Written tests (CA - 2) 30 Marks

Other Components (45 Marks- Converted into 20 Marks)

MCQ-1	10 Marks
MCQ-2	10 Marks
Seminar-1	10 Marks
Seminar-2	10 Marks
Library	05 Marks

Question Paper Pattern for Semester Examinations

The question paper shall have three sections with the maximum of 100 marks with the following break-up:

Section – A (10 x 2 = 20 marks)

Section A shall contain 10 short answer questions drawn from all the units on the basis of minimum two from units. All ten are to be answered each carrying 2 marks.

Section – B (5 x 7 = 35 marks)

Section B shall contain 5 either or questions drawn from all the five units.
Each question shall carry 7 marks.

Section – C (3 x 15 = 45 marks)

Section C shall contain 5 questions drawn one each from the five units.
Three questions out of the five are to be answered each carrying 15 marks.

Question Paper Pattern for CA

The question paper shall have three sections with the maximum of 50 marks with the following break-up:

Section-A

Section A shall contain 6 short answer questions without choice drawn from two units
Each question shall carry 2 marks. (6 x 2 = 12 marks)

Section-B

Section B shall contain 3 either or questions drawn from two units.
Each question shall carry 6 marks. (3 x 6 = 18 marks)

Section–C

Section C shall contain 3 questions from two units.
Two questions out of the three are to be answered each carrying 10 marks.
(2 x 10 = 20 marks)

Regulations for Core Practicals

Total: 100 Marks
Time: 6 Hours

The practical papers consist of the internal assessment (50 marks) and semester examination (50 marks)

Internal Assessment (50)

Class Work - 25 marks
Model exam - 25 marks

Semester Examination (50) **Total : 50 Marks**
Time : 6 Hours

1. Experiment-I - 15 Marks
2. Experiment-II - 15 Marks
3. Viva-Voce - 10 Marks
4. Record - 10 Marks

Regulations for Internship Report

Internship Report with Certificate – Minimum of 30 to 45 days Training

Total Marks: 100

Internal : 50

I Review : 25
II Review : 25

Internship Report : 50

Semester	Course Code	Title of the Course	Hours/week	Credits
II	BCD209	Advanced Molecular Laboratory Techniques	5	4

Course Objectives:

To learn the fundamentals of nucleic acid blotting techniques.
To explore the Polymerase Chain Reaction.
To understand the basic concepts of DNA sequencing.
To give basic ideas about how Hybridization are useful in research investigation.
To get familiar with the Radio isotopic techniques.

Course Outcomes:

S.No.	Description	Cognitive Level (K-level)
CO-1	Define and understand the nucleic acid blotting techniques, its principle, instrumentation and its types.	**K1, K2**
CO-2	Determine the knowledge of polymerase chain reaction and its applications	**K3**
CO-3	Discuss the importance of DNA sequencing in diagnostics and its significance.	**K2**
CO-4	Assess the DNA finger printing and genome analysis.	**K5**
CO-5	Correlate the characteristics of Hybridization, immunohistochemistry HLA DNA polymorphism, and parentage testing.	**K4**
CO-6	Originate the principle, instrumentation and applications of the radio isotopic techniques.	**K6**

Unit - I: Nucleic acid Blotting Techniques – Principle, instrumentation, types – southern,northern,Dot, western blotting, colony and plaque blotting and its applications

Unit - II: PCR [Polymerase Chain Reaction]- source, Principle, instrumentation, applications and its types.

Unit - III: DNA sequencing –Maxam and Gilbert technique, Dideoxy nucleotide method, DNA sequencing by primer walking, Chromosome walking, chromosomal jumping, RFLP and chromosomal aberrations, DNA finger printing and genome analysis.

Unit - IV: Hybridization - Tissue *in situ* hybridization; relationship of *in situ* hybridization to other molecular methods of immunohistochemistry, technical consideration and methodology; HLA DNA polymorphism, and parentage testing.

Unit - V: Radio isotopic techniques – Principle, instrumentation and applications of Dilution studies, dynamic function test, organ scanning auto radiography and radio immuno assay

Reference Books

Sathyanarayana.U. Biotechnology

Henry, John Bernard, Todd Sanford and Davidson, 2002. Clinical diagnosis and management by laboratory methods. W.B. Saunders& Co

Fischbach Francis A, 2003. Manual of laboratory and diagnostic tests. Philadelphia,J.B. Lippancott& Co, N.Y.

Gradwohls, 2000. Clinical laboratory methods and diagnosis ed.Alex.C. Sonnenwirth& Leonard Jarret.M.D.B.I.Publications, New Delhi,

Sood, R, 2005, Medical Laboratory methods and interpretation, Jaypee brothers medical publications, New Delhi.

Semester	Course Code	Title of the Course	Hours/Week	Credits
VI	BCD210	Human Pathogens & Body Fluid Analysis	5	4

Course Objectives:

To acquire broad knowledge on human pathogens, its symptoms, causes and treatment.
To understand the fundamentals concepts in bacteriology, virology and mycology.
To know the basics of source and mode of action of Viruses and fungi infecting the humans.
To comprehend the formation, collection and functions of Amniotic and Cerebrospinal fluids.
To exhibit skills on the formation, collection and functions of Serous fluid and other body fluids.

Course Outcomes:

S.No.	Description	Cognitive Level (K-Level)
CO-1	Identify the fundamentals concepts in human pathogens, its symptoms, causes and treatment.	**K1**
CO-2	Demonstrate broad knowledge on the fundamentals concepts in bacteriology and virology.	**K2**
CO-3	Distinguish the fundamentals concepts in mycology and its pathogenesis in humans.	**K2**
CO-4	Determine to know the fundamentals of source and mode of action of Human Viruses and fungi.	**K3**
CO-5	Correlate and measure the formation, collection and functions of Amniotic and Cerebrospinal fluids.	**K4, K5**
CO-6	Originate on the formation, collection and functions of Serous fluid and other body fluids.	**K6**

Unit-I: Bacteriology: Symptoms, causes and treatment of pathogenic and non-pathogenic bacterias. Pathogenic Bacteria-TB, Salmonella typhi, vibrio cholera, Clostridium tetani coli, bifidobacteria, -Non-Pathogenic Bacteria- staphylococcus, lactobacillus, Escherichia bacteroides and *Brevibacterium linens*.

Unit-II: Virology: Classification, Source and mode of action of Human Viruses – HIV, HSV, Swine flu (H1 N1), chicken guinea, Rota virus, Ebola virus, SAARS, Dengue, Corona, Adenovo virus, Hepatitis and Bacteriophage.

Unit-III: Mycology: Dimorphic fungi causing systemic Mycoses, Diamataeceous Fungi, agents of Zygomycosis, Fungi causing Eumycoticmycetoma.

Unit-IV: Amniotic & Cerebrospinal fluid

Amniotic Fluid: Formation and function of amniotic fluid, Chemical composition, Collection, Testing – Alpha fetoprotein, Acetyl cholinesterase, Neural tube defects, Chromosomal abnormalities, Haemolytic disease of new born, Gestation age, Fetal maturation. Cerebrospinal fluid: Formation, Specimen collection, Chemical analysis, Microbiologic examination, Immunologic tests, Cytological examination and clinical correlation.

Unit-V: Serous fluid & other body fluids

Formation, Collection, Classes of effusions, Cell types and clinical correlations. Lymph, Gastric fluid, Urine, Faeces, Seminal fluid, Sputum and sweat, Biomarker evaluation in body fluids for specific therapeutic prognostic and /or diagnostic potential.

Reference Books

Richard, D.G., C.B., Slack, J.F. Penthere, 1996. Medical Microbiology. Churchill Livingstone, USA.

Chatterjee, 1986, Medical Parasitology, Tata McGraw Hill, India.

Pelczar,M.J., E.C.S. Chan., Krieg, N.R, 1996. Microbiology, Tata McGraw Hill, India.

Tortora, G.S., Grabowski, S.R., Principles of Anatomy & Physiology,1996,8th edition, Harper Collins, NY.

Guyton & Hall., Textbook of Medical Physiology,2000,10th edition, Elseiner, New Delhi.

JuneH.Cella, JuanitaWatson, Manual of Laboratory Tests, 2004, Aitbs Publishers, New Delhi

Elkinton&Danowski, The Body Fluids, 2002,Williams &Wilkins, Baltimore

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Lab Course – III
Urine Analysis and Stool Examination

5 Hrs / week

Practical - III **4 Credits**

I.Urine Analysis

i. Collection and physical examination:

Collection of urine, Types of preservative, physical examination; Volume, colour, odour, appearance, specific gravity and pH.

ii. Chemical examination

Reducing sugar-Benedict test, protein:- Heat and acetic acid test, and sulfosalicylic acid method, Ketone bodies-Roth era's test, Bile pigment (Fouchetmethod), bile salt (Hay's test), Urobilinogen-Ehrlich aldehyde test and Bence Jones protein test, Renal clearance test-urea, creatine, Test for mucin.

iii. Microscopical Examination

Microscopic examination; Identification of casts and crystals and blood cells-RBC,WBC, SE
epithelial cells, smear for gram staining and urine culture.

II. Stool Analysis

i. Collection and physical examination:

Collection of fecal specimen, preservation, physical examination; volume, colour, odour and
appearance.

ii. Chemical examination:

reducing sugar, occult blood test Demonstration of fat in stool, detection of steatorrhoea.

iii. Microscopic Examination

Concentration method, direct centrifuge floatation method and ether extraction method for ova and cysts. Identification of crystals, meat fibers, fat globules and blood cells.Culture especially for enriched group of organisms.

III. Salivary Analysis: Salivary Cortisol

IV. Tears Analysis

V. Other Body fluid Analysis

Seminal fluid, Amniotic fluid and CSF

Reference Books

1. Sabitrisanyal-(1991): Text book of pathology, first edition,
2. June H.cella- (1994): Manual of laboratory test, AITBS publishers.