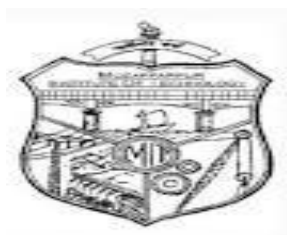


**DEPARTMENT OF PHARMACY
MIT MUZAFFARPUR**



**AFFILIATED TO
ARYABHATTA KNOWLEDGE UNIVERSITY,
MITHAPUR, PATNA**

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**NAME OF COURSE: PHARMACEUTICAL
BIOTECHNOLOGY
COURSE CODE (T): 091704
COURSE CODE (P): 091702 P
SEMESTER : VII
ACADEMIC YEAR : 2018-2019**

PHARMACEUTICAL CHEMISTRY -VII

B. PHARM – SEVENTH SEMESTER

1. Course Syllabus

Module-1

Immunology and Immunological Preparations: Principles, antigens and haptens, immune system, cellular humoral immunity, immunological tolerance, antigen-antibody reactions and their applications. Hypersensitivity, Active and passive immunization, Vaccines-their preparation, standardization and storage.

Module-2

Genetic Recombination: Transformation, conjugation, transduction, protoplast fusion and gene cloning and their applications. Development of hybridoma for monoclonal antibodies. Study of drugs produced by biotechnology such as Activase, Humulin, Humatrope, HB etc.

Antibiotics: Historical development of antibiotics. Antimicrobial spectrum and methods used for their standardization. Screening of soil for organisms producing antibiotics, fermenter, its design, control of different parameters. Isolation of mutants, factors influencing rate of mutation. Design of fermentation process. Isolation of fermentation products with special reference to penicillins, streptomycins tetracyclines and vitamin B12.

Module-3

Microbial Transformation: Introduction, types of reactions mediated by microorganisms, design of biotransformation

processes, selection of organisms, biotransformation process and its improvements with special reference to steroids.

Enzyme immobilization: Techniques of immobilization, factors affecting enzyme kinetics. Study of enzymes such as hyaluronidase, penicillinase, streptokinase and streptodornase, amylases and proteases etc. Immobilization of bacteria and plant cells.

Recommended Books:

1. Industrial Microbiology by Casida.
2. Industrial Microbiology by A.H. Patel.
3. Industrial microbiology by Prescott and Dunn.
4. Pharmaceutical Biotechnology by Vyas and Dixit.
5. Molecularbiology and Genetic Engineering by A.M.Narayanan, A.M.Selvaraj, A.Mani
6. Text Book of Microbiology by Anantanarayana and Panicker.
7. Concepts in Biotechnology by Balasubramanium.
8. Molecular Biotechnology by Glick.

SAMPLE TIME TABLE

MUZAFFARPUR INSTITUTE OF TECHNOLOGY

ODD SEM (JULY- DEC 2018) TIME TABLE FOR 3rd , 5th & 7th SEMESTER, B.PHARM, WITH EFFECT FROM 16.07.20

DAY	SEMESTER	9 AM TO 10	10 -11 AM	11- 12 AM	12 -1 PM	2- 3 PM	3 PM
MON	THIRD SEM	APHE II SK	PHARM ANAL II GT	PHARMACEUTICS III AB	PHARMACOGNOSY II NRB		CLAS
	FIFTH SEM	PHARMACEUTICS V RKC	PHARMACEUTICS V LAB RKC				CLAS
	SEVENTH SEM	PHARMA. BIOTECH SNS	PHARM CHEM VII RP	PHARMA. INDUST. MANAG.	PHARMACOLOGY III RP		CLAS
TUES	THIRD SEM	PHARMACEUTICS III AB	PHARM CHEM IV SW	PHARMACEUTICS III AB(T)	PHARM ANAL II GT(T)		PHARMA LAB
	FIFTH SEM	PHARM CHEM V SNS	PHARMACEUTICS VI AB	PHARMA CEUTICS V RKC	PHARMACOLOGY I SK		PHARM C S
	SEVENTH SEM	PHARMACEUTICS VIII RKC	PHARM CHEM VII RP	PHARMACOLOGY III RP	PHARMACEUTICS VIII RKC(T)		PHARMA LAB
WED	THIRD SEM		PHARMACOGNOSY II NRB(T)	PHARMACOGONOSY II NRB	PHAR ANAL II GT		PHARMA II LAB
	FIFTH SEM	PHARMACOLOGY I SK	PHARM CHEM V SNS	PHARMACEUTICS VI AB	PHARMACOLOGY I SK(T)		PHARMA LAB
	SEVENTH SEM	PHARM CHEM VII RP(T)	PHARMACEUTICS VIII RKC	PHARM CHEM VII RP	ELECTIVE OPT		PHARM C
THURS	THIRD SEM	APHE II SK(T)	PHARM CHEM IV SW	APHE II SK	PHARM CHEM IV SW(T)		PHARM A C
	FIFTH SEM	PHARM CHEM V SNS	PHARMACEUTICS VI AB	PHARMACOGONOSY IV SW			PHARMA IV LA

	SEVENTH SEM	PHARMACEUTICS VIII RKC	PHARMA. BIOTECH SNS(T)	PHARMACOLOGY III RP	ELECTIVE OPT	ELECTIVE
FRI	THIRD SEM	APHE II SK	PHARMACUTICAL CHEMISTRY IV LAB SW			APHE I
	FIFTH SEM	PHARMACOGONOSY IV SW	PHARMACEUTICS V RKC	PHARMACOGONOSY IV SW(T)	PHARMACEUTICS V RKC(T)	PHARMA LAB C
	SEVENTH SEM		ELECTIVE OPT (T)	ELECTIVE OPT	PHARMA. BIOTECH.SNS	PHARMA III RK
SAT	THIRD SEM	PHARMACOGONOSY II NRB	PHARM CHEM IV SW	PHAR ANAL II GT	PHARMACEUTICS III AB	
	FIFTH SEM	PHARM CHEM V SNS(T)	PHARMACOLOGY I SK	PHARMACEUTICS VI AB	PHARMACOGONOSY IV SW	
	SEVENTH SEM	PHARMACOLOGY III RP(T)	PHARMA. INDUST. MANAG.	PHARMA. BIOTECH SNS		

2. Program Objectives (POs)

The graduates of the programme will possess:

1. The knowledge of core concepts of Biotechnology.
2. The knowledge of antibiotics.
3. Modern methods of preparation drugs

3.Course Outcomes (COs)

1 Recall the biochemical organization of the cell, transport process and describe enzymes and isoenzymes in the field of clinical diagnosis. metals and Vitamins as co-enzymes and their significance in human body.

2 Explain the metabolism of carbohydrate, lipid, protein and their role in our body

4 Analyze carbohydrate, lipid, protein, the generation of ATP and isolate RNA and DNA from different sources.

5. Illustrate various mechanism related to genetics, PCR, repair mechanism

4. Mapping of COs with Pos

PO	CO1	CO2	CO3	CO4
1				
2				
3				
4				
5				

6				
7				
8				
9				
10				
11				
12				

5. Assessment Methods for Cos

5.1. Theory

S.No	Assessment Tools	Marks	Outcomes
1	Sessional Examination	20	CO1 CO2 CO3 CO4

2	Assignment	02	CO1 CO2 CO3 CO4
3	Presentation	02	CO1 CO2 CO3 CO4
4	Quizzes	01	CO1 CO2 CO3 CO4
5	Attendance	05	NA
6	University Examination	70	NA

5.2. Practical

S.No	Assessment Tools	Marks	Outcomes
1	Attendance	05	CO1 CO2 CO3 CO4
2	Experiment valuation	10	CO1 CO2 CO3 CO4
3	Internal Viva- voce	05	CO1 CO2 CO3 CO4
4	University Practical Exam	30	CO1 CO2 CO3 CO4

6. Delivery Methodology

Outcomes	Methods	Supporting Tools
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CO 1	Chalk-Talk, Interactive classroom, ICT usage, Case study discussion about diseases, Group discussions, , Web based learning	Board, Laptop, Projector, You Tube, Whatsapp, Google,
CO2	Chalk-Talk, Interactive classroom, ICT usage, Case study discussion about diseases, Group discussions, , Web based learning	Board, Laptop, Projector, You Tube, Whatsapp, Google,
CO3	Chalk-Talk, Interactive classroom, ICT usage, Case study discussion about diseases, Group discussions, , Web based learning	Board, Laptop, Projector, You Tube, Whatsapp, Google,
CO4	Chalk-Talk, Interactive classroom, ICT usage, Case study discussion about diseases, Group discussions, , Web based learning	Board, Laptop, Projector, You Tube, Whatsapp, Google,

7. Teaching plan

7.1. Theory

Lecture No.	Contents
1	Biochemical organization of the cell and transport processes across cell membrane.
2	Biochemical organization of the cell and transport processes across cell membrane.
3	The concept of free energy
4	determination of change in free energy -from equilibrium constant and reduction potential

5	Bioenergetics, production of ATP and its biological significance.
6	Enzymes: Nomenclature
7	Enzyme kinetics and its mechanism of action, mechanism of inhibition, Class Test
8	Enzymes and iso-enzymes in clinical diagnosis.
9	Co-enzymes: Vitamins as co-enzymes and their significance Metals as co-enzymes and their significance.
10	Carbohydrate Metabolism: Conversion of polysaccharide to glucose-1-phosphate, Glycolysis
11	Fermentation and their regulation, Gluconeogenesis and glycogenolysis,
12	Fermentation and their regulation, Gluconeogenesis and glycogenolysis,
13	Metabolism of galactose and galactosemia,
14	Role of sugar nucleotides in biosynthesis, and Pentosephosphate pathway.
15	The Citric Acid Cycle: Significance, reactions and energetic of the cycle, Amphibolic role of the cycle, and Glyoxalic acid cycle.
16	The Citric Acid Cycle: Significance, reactions and energetic of the cycle, Amphibolic role of the cycle, and Glyoxalic acid cycle.
17	Lipids Metabolism: Oxidation of fatty acids, oxidation & energetic, α -oxidation, Class Test
18	Biosynthesis of ketone bodies and their utilization.
19	Biosynthesis of saturated and unsaturated fatty acids, Control of lipid metabolism
20	Essential fatty acids & eicosanoids (prostaglandins, thromboxanes and leukotrienes), phospholipids, and sphingolipids.
21	Essential fatty acids & eicosanoids (prostaglandins, thromboxanes and leukotrienes), phospholipids, and sphingolipids.

22	Biological Oxidation: Redox-potential, enzymes and co-enzymes involved in oxidation reduction & its control,
23	The respiratory chain, its role in energy capture and its control,
24	Energetics of oxidative phosphorylation,
25	Inhibitors of respiratory chain and oxidative phosphoryla
26	Mechanism of oxidative phosphorylation
27	Nitrogen Cycle, Nitrogen fixation. ammonia assimilation, nitrification and nitrate assimilation
28	Sulphur Cycle, Sulphate activation.
29	Sulphate reduction
	Class Test
30	Incorporation of sulphur in organic compounds. Release of sulphur from organic compounds.
31	Metabolism of Ammonia and Nitrogen Containing Monomers
32	Biosynthesis of amino acids. Catabolism of amino acids.
33	Conversion of amino acids to specialized products, Assimilation of ammonia. Urea. cycle, metabolic disorders of urea cycle. Metabolism of sulphur containing amino acids
34	Porphyrin biosynthesis. formation of bile pigments. hyperbilirubinemia.
35	Purine biosynthesis. Purine nucleotide interconversion. Pyrimidine biosynthesis. and Formation of deoxyribounucleotides.
36	Biosynthesis of Nucleic Acids: Brief introduction of genetic organization of the mammalian genome, alteration and rearrangements of genetic material, Biosynthesis of DNA and its replication.
37	Mutation: Physical & chemical mutagenesis / carcinogenesis
38	DNA repair mechanism. Biosynthesis of RNA.
39	Genetic Code and Protein Synthesis: Genetic code
40	Components of protein synthesis and Inhibition of protein synthesis.
41	Brief account of genetic engineering and polymerase chain reactions.
42	Regulation of gene expression

7.2. Practical

Exp. No	Experiment
1	Preparation of standard buffers (citrate, phosphate and carbonate) and measurement of pH
2	Titration curve for amino acids
2	Separation of amino acids by two dimensional paper chromatography and gel electrophoresis
3	The separation of lipids by TLC.
4	Separation of serum proteins by electrophoresis on cellulose acetate
5	Quantitative estimation of amino acids
6	Quantitative estimation of proteins
7	The identification of c-terminal amino acids of a protein
8	The determination of glucose by means of the enzyme glucose oxidase.
9	The isolation and assay of glycogen from the liver and skeletal muscle of rats
10	Enzymatic hydrolysis of glycogen by. alpha-and beta-amylases

11	The isolation and determination of RNA and DNA.
12	Effect of temperature on the activity of alpha -amylase.
13	.Estimation of SGOT, SGPT, ALP and BRN in the serum