

Program Structure

of

**Diploma in Pharmacy
(D. Pharm.)**

About the Program

Diploma in Pharmacy (D. Pharm.) is a 2 years undergraduate Course focused on the properties and impacts of pharmaceutical drugs. The programme prepares students to develop the necessary skills to counsel patients about medications and the use of drugs. The curriculum of Diploma in pharmacy Course at Tula's Institute of Pharmacy is designed according to Pharmacy Council of India (PCI) the statutory body governing the pharmacy profession in India.

The course equips students with a profound understanding of human anatomy, drug dosage, drug action and reaction, and active ingredients used in the formulation of the drugs and how to maintain their quality in the storage.

PEO's - Program Educational Objectives (D. Pharmacy)

1. To bestow students different aspects of pharmaceutical sciences, which include different dosage form and their classification, manufacturing process and uses.
2. To develop an Ability to identify, formulate and solve community & hospital pharmacy problems.
3. To impart Knowledge of professional and ethical responsibilities as per Pharmaceutical jurisprudence.
4. To have Ability to work with clinicians, to determine the role of the laboratory in specific situations to optimize patient safety.
5. To make students understand the various function of hospital and hospital pharmacy, various in- patient and outpatient services, manufacturing within the hospital.

PO's - Program Outcomes (D. Pharmacy)

Blooms Level	PO	Outcome
L1& L2	PO1	Pharmacy knowledge: Illustrate knowledge and comprehension of the core and basic knowledge associated with the profession of pharmacy.
L2, L3 & L5	PO2	Modern tool usage: Choose and Interpret appropriate methods and procedures, resources, and modern pharmacy-related computing tools with an understanding of the limitations
L2 & L4	PO3	Leadership skills: Understand and consider the human reaction to change, motivation issues, leadership and team building when planning changes required for fulfillment of practice, professional and societal responsibilities. Assume participatory roles as responsible citizens or leadership roles when appropriate to facilitate improvement in health and wellbeing.
L2 & L4	PO4	Professional Identity: Understand, analyze and communicate the value of their professional roles in society (e.g. health care professionals, promoters of health, educators, managers, employers, employees).
L2, L3& L5	PO5	Pharmaceutical Ethics: Justify personal values and apply ethical principles in professional and social contexts. Demonstrate behavior that recognizes

		cultural and personal variability in values, communication and lifestyles. Use ethical frameworks; apply ethical principles while defending decisions and take responsibility for the outcomes associated with the decisions.
L3 & L5	PO6	Communication: Carryout projects effectively within the pharmacy community and with society, such as, being able to Interpret and write effective reports, make effective presentations and documentation, and give and receive clear instructions.
L3	PO7	The Pharmacist and society: Apply(3) reasoning informed by the contextual knowledge to assess societal, health, safety and legal issues and the consequent responsibilities relevant to the professional pharmacy practice.
L6	PO8	Environment and sustainability: Predict(6) the impact of the professional pharmacy solutions in societal and environmental contexts, combine(6) the knowledge of, and need for sustainable development.
L1, L3, L4, L5 & L6	PO9	Life-long learning: Recognize(1) the need for, and have the preparation and ability to engage in independent and life-long learning in the broadest context of technological change. Self-assess(5) and use(3) feedback effectively from others to Examine(4) learning needs and to design(6) solution for these needs on an ongoing basis.

Program Specific Outcomes (PSOs) for Diploma Course in Pharmacy

PSO.1 Know different aspects of pharmaceuticals, which include different dosage form and their classification, manufacturing process and uses.

PSO.2 Ability to identify, formulate and solve community & hospital pharmacy problems.

PSO.3 Knowledge of professional and ethical responsibilities as per pharmaceutical jurisprudence.

PSO.4 Ability to work with clinicians, to determine the role of the laboratory in specific situations to optimize patient safety.

PSO.5 Able to understand the various function of hospital and hospital pharmacy, various inpatient and outpatient services, manufacturing within the hospital

ER-2020 D. Pharm Syllabus – Part I

S. No.	Course Code	Name of the Course	Total Hours	Hours per Week
1.	ER20-11T	Pharmaceutics – Theory	75	3
2.	ER20-11P	Pharmaceutics – Practical	75	3
3.	ER20-12T	Pharmaceutical Chemistry – Theory	75	3
4.	ER20-12P	Pharmaceutical Chemistry – Practical	75	3
5.	ER20-13T	Pharmacognosy – Theory	75	3
6.	ER20-13P	Pharmacognosy – Practical	75	3
7.	ER20-14T	Human Anatomy & Physiology – Theory	75	3
8.	ER20-14P	Human Anatomy & Physiology – Practical	75	3
9.	ER20-15T	Social Pharmacy – Theory	75	3
10.	ER20-15P	Social Pharmacy – Practical	75	3

PHARMACEUTICS – THEORY

Course Code: ER20-11T

75 Hours (3 Hours/week)

Scope: This course is designed to impart basic knowledge and skills on the art and science of formulating and dispensing different pharmaceutical dosage forms.

Course Objectives: This course will discuss the following aspects of pharmaceutical dosage forms

1. Basic concepts, types and need
2. Advantages and disadvantages, methods of preparation / formulation
3. Packaging and labeling requirements
4. Basic quality control tests, concepts of quality assurance and good manufacturing practices

Course Outcomes: Upon successful completion of this course, the students will be able to

1. **Understand(2)** the basic concept, history of Pharmacy in India. Also will be able to **Interpret(5)** the Pharmacopoeia, various dosage forms, information about prescription and posology means calculation of doses
2. **Explain(2)** about the different dosage forms and their formulation aspects
3. **Explain(2)** the advantages, disadvantages and quality control tests of different dosage forms.
4. **Justify(5)** the importance of quality assurance & good manufacturing practice.

Course Objective / Course Outcomes Mapping					
Course Objective	Course Outcomes (CO)				
	CO1	CO2	CO3	CO4	CO5
CO1	★	★			★
CO2			★	★	★
CO3	★	★		★	★
CO4	★		★	★	

PHARMACEUTICS – PRACTICAL

Course Code: ER20-11P

75 Hours (3 Hours/week)

Scope: This course is designed to train the students in formulating and dispensing common pharmaceutical dosage forms.

Course Objectives: This course will discuss and train the following aspects of preparing and dispensing various pharmaceutical dosage forms

1. Calculation of working formula from the official master formula
2. Formulation of dosage forms based on working formula
3. Appropriate Packaging and labelling requirements
4. Methods of basic quality control tests

Course Outcomes: Upon successful completion of this course, the students will be able to

1. **Develop**(3) the working formula from the given master formula
2. **Formulate**(6) the dosage form and dispense in appropriate container
3. **Illustrate**(2) the label with necessary product and patient information
4. **Carry out** (3)the basic quality control tests for the common dosage forms
5. **Understand**(2) the procedure and various excipients used in dosage forms.

Course Objective / Course Outcomes Mapping					
Course Objective	Course Outcomes (CO)				
	CO1	CO2	CO3	CO4	CO5
CO1	★		★	★	
CO2	★	★	★	★	★
CO3		★	★	★	★
CO4	★		★		★

PHARMACEUTICAL CHEMISTRY – THEORY

Course Code: ER20-12T

75 Hours (3 Hours/week)

Scope: This course is designed to impart basic knowledge on the chemical structure, storage conditions and medicinal uses of organic and inorganic chemical substances used as drugs and pharmaceuticals. Also, this course discusses the impurities, quality control aspects of chemical substances used in pharmaceuticals.

Course Objectives: This course will discuss the following aspects of the chemical substances used as drugs and pharmaceuticals for various disease conditions

1. Chemical classification, chemical name, chemical structure
2. Pharmacological uses, doses, stability and storage conditions
3. Different types of formulations / dosage form available and their brand names
4. Impurity testing and basic quality control tests

Course Outcomes: Upon successful completion of this course, the students will be able to

1. Outline(2) the chemical class, structure and chemical name of the commonly used drugs and pharmaceuticals of both organic and inorganic nature
2. Conclude(3) the pharmacological uses, dosage regimen, stability issues and storage conditions of all such chemical substances commonly used as drugs
3. Explain(2) the quantitative and qualitative analysis, impurity testing of the chemical substances given in the official monographs
4. Identify(1) the dosage form & the brand names of the drugs and pharmaceuticals popular in the marketplace
5. Explain(2) the sources of impurities and methods to determine the impurities in inorganic drugs and pharmaceuticals.

Course Objective / Course Outcomes Mapping					
Course Objective	Course Outcomes (CO)				
	CO1	CO2	CO3	CO4	CO5
CO1	★		★	★	★
CO2	★	★	★		★
CO3	★	★	★	★	★

CO4		★		★	
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PHARMACEUTICAL CHEMISTRY – PRACTICAL

Course Code: ER20-12P

75 Hours (3 Hours/week)

Scope: This course is designed to impart basic training and hands-on experiences to synthesis chemical substances used as drugs and pharmaceuticals. Also, to perform the quality control tests, impurity testing, test for purity and systematic qualitative analysis of chemical substances used as drugs and pharmaceuticals.

Course Objectives: This course will provide the hands-on experience on the following aspects of chemical substances used as drugs and pharmaceuticals

1. Limit tests and assays of selected chemical substances as per the monograph
2. Volumetric analysis of the chemical substances
3. Basics of preparatory chemistry and their analysis
4. Systematic qualitative analysis for the identification of the chemical drugs

Course Outcomes: Upon successful completion of this course, the students will be able to

1. **Carry out** (3) the limit tests for various inorganic elements and report
2. **Formulate** (6) standard solutions using the principles of volumetric analysis
3. **Examine** (4) the procedure/method for identifying impurities in pharmaceuticals.
4. **Appraise** (5) the procedure for identification of inorganic compounds and their purities.
5. **Understand**(2) the method of preparation of inorganic pharmaceuticals

Course Objective / Course Outcomes Mapping					
Course Objective	Course Outcomes (CO)				
	CO1	CO2	CO3	CO4	CO5
CO1	★	★		★	
CO2		★	★	★	★
CO3	★	★	★		★
CO4	★		★	★	★

PHARMACOGNOSY – THEORY

Course Code: ER20-13T

75 Hours (3 Hours/week)

Scope: This course is designed to impart knowledge on the medicinal uses of various drugs of natural origin. Also, the course emphasizes the fundamental concepts in the evaluation of crude drugs, alternative systems of medicine, nutraceuticals and herbal cosmetics.

Course Objectives: This course will discuss the following aspects of drug substances derived from natural resources.

1. Occurrence, distribution, isolation, identification tests of common phytoconstituents
2. Therapeutic activity and pharmaceutical applications of various natural drug substances and phytoconstituents
3. Biological source, chemical constituents of selected crude drugs and their therapeutic efficacy in common diseases and ailments
4. Basic concepts in quality control of crude drugs and various system of medicines
5. Applications of herbs in health foods and cosmetics

Course Outcomes: Upon successful completion of this course, the students will be able to

1. **Identify**(1) the important/common crude drugs of natural origin
2. **Explain**(2) the uses of herbs in nutraceuticals and cosmeceuticals
3. **Compare**(4) the principles of alternative system of medicines
4. **Assess**(5) the importance of quality control of drugs of natural origin
5. **Understand**(2) and **carryout**(3) the separation of Phytoconstituents from mixture by Means of Chromatography

Course Objective / Course Outcomes Mapping					
Course Objective	Course Outcomes (CO)				
	CO1	CO2	CO3	CO4	CO5
CO1	★			★	★
CO2	★	★	★		★
CO3		★	★	★	
CO4	★	★	★	★	★
CO5	★		★	★	

PHARMACOGNOSY – PRACTICAL

Course Code: ER20-13P

75 Hours (3 Hours/week)

Scope: This course is designed to train the students in physical identification, morphological characterization, physical and chemical characterization, and evaluation of commonly used herbal drugs.

Course Objectives: This course will provide hands-on experiences to the students in

1. Identification of the crude drugs based on their morphological characteristics
2. Various characteristic anatomical characteristics of the herbal drugs studied through transverse section
3. Physical and chemical tests to evaluate the crude drugs

Course Outcomes: Upon successful completion of this course, the students will be able to

1. **Identify**(1) the given crude drugs based on the morphological characteristics
2. **Develop**(3) a transverse section of the given crude drugs
3. **Compare**(4) the anatomical characteristics of the given crude drug under microscopical conditions
4. **Carry out**(3) the physical and chemical tests to evaluate the given crude drugs
5. **Illustrate**(2) the isolation volatile oil from crude drugs

Course Objective / Course Outcomes Mapping					
Course Objective	Course Outcomes (CO)				
	CO1	CO2	CO3	CO4	CO5
CO1	★			★	★
CO2	★	★	★		★
CO3		★	★	★	
CO4	★	★	★	★	★
CO5	★		★	★	

HUMAN ANATOMY AND PHYSIOLOGY – THEORY

Course Code: ER20-14T

75 Hours (3

Hours/week)

Scope: This course is designed to impart basic knowledge on the structure and functions of the human body. It helps in understanding both homeostasis mechanisms and homeostatic imbalances of various systems of the human body.

Course Objectives: This course will discuss the following : _

1. Structure and functions of the various organ systems and organs of the human body
2. Homeostatic mechanisms and their imbalances in the human body
3. Various vital physiological parameters of the human body and their Significances
4. Explore and update the knowledge of special senses and nervous system

Course Outcomes: Upon successful completion of this course, the students will be able to

1. Classify(4) the various organ systems of the human body
2. Illustrate (2) the anatomical features of the important human organs and tissues
3. Explain(2) the homeostatic mechanisms regulating the normal physiology in the human system
4. Defend(5) the significance of various vital physiological parameters of the human body
5. Identify(1) the various tissues and organs of different systems along with their co-relation with human body.

Course Objective / Course Outcomes Mapping					
Course Objective	Course Outcomes (CO)				
	CO1	CO2	CO3	CO4	CO5
CO1	★	★	★		★
CO2	★		★	★	★

CO3		★	★	★	
CO4	★	★		★	★
CO5	★		★	★	

HUMAN ANATOMY AND PHYSIOLOGY – PRACTICAL

Course Code: ER20-14P

75 Hours (3 Hours/week)

Scope: This course is designed to train the students and instil the skills for carrying out basic physiological monitoring of various systems and functions.

Course Objectives: This course will provide hands-on experience in the following

1. General blood collection techniques and carrying out various haematological assessments and interpreting the results
2. Recording and monitoring the vital physiological parameters in human subjects and the basic interpretations of the results
3. Microscopic examinations of the various tissues permanently mounted in glass slides
4. Discuss the anatomical and physiological characteristics of various organ systems of the body using models, charts and other teaching aids

Course Outcomes: Upon successful completion of this course, the students will be able to

1. **Carry out**(3) the haematological tests in human subjects and interpret the results
2. Record, monitor and document the vital physiological parameters of human subjects and **interpret**(5) the results
3. **Compare**(4) the anatomical features of the important human tissues under the microscopical conditions
4. **Appraise**(5) the significance of various anatomical and physiological characteristics of the human body
5. **Identify**(1) and **understand**(2) concept of axial, appendicular skeleton and separate bone

Course Objective / Course Outcomes Mapping					
Course Objective	Course Outcomes (CO)				
	CO1	CO2	CO3	CO4	CO5
CO1		★	★		★
CO2	★	★	★	★	★

CO3	★	★	★	★	★
CO4	★	★	★	★	

SOCIAL PHARMACY – THEORY

Course Code: ER20-15T

75 Hours (3 Hours/week)

Scope: This course is designed to impart basic knowledge on public health, epidemiology, preventive care and other social health related concepts. Also, to emphasize the roles of pharmacists in the public health programs.

Course Objectives: This course will discuss about basic concepts of

1. Public health and national health programs
2. Preventive healthcare
3. Food and nutrition related health issues
4. Health education & promotion
5. General roles and responsibilities of pharmacists in public health

Course Outcomes: Upon successful completion of this course, the students will be able to

1. **Explain**(2) about roles of pharmacists in the various national health programs
2. **Compare**(4) various sources of health hazards and disease preventive measures
3. **Examine**(4) the healthcare issues associated with food and nutritional substances
4. **Provide**(3) the general roles and responsibilities of pharmacists in public health
5. **Dissect**(4) the community health services in rural, urban and school health

Course Objective / Course Outcomes Mapping					
Course Objective	Course Outcomes (CO)				
	CO1	CO2	CO3	CO4	CO5
CO1	★	★		★	★
CO2		★	★	★	
CO3	★	★	★	★	★
CO4	★	★	★		★
CO5	★	★	★	★	★

SOCIAL PHARMACY – PRACTICAL

Course Code: ER20-15P

75 Hours (3 Hours/week)

Scope: This course is designed to provide simulated experience in various public health and social pharmacy activities.

Course Objectives: This course will train the students on various roles of pharmacists in public health and social pharmacy activities in the following areas

1. National immunization programs
2. Reproductive and child health programs
3. Food and nutrition related health programs
4. Health education and promotion
5. General roles and responsibilities of the pharmacists in public health
6. First Aid for various emergency conditions including basic life support and cardiopulmonary resuscitation

Course Outcomes: Upon successful completion of this course, the students will be able to

1. **Explain**(2) the roles and responsibilities of pharmacists in various National health programs
2. **Design**(6) promotional materials for public health awareness
3. **Assess**(5) various health hazards including microbial sources
4. **Advice** and **Plan**(6) on preventive measures for various diseases
5. **Provide**(3) first aid for various emergency conditions including basic life support and cardiopulmonary resuscitation

Course Objective / Course Outcomes Mapping					
Course Objective	Course Outcomes (CO)				
	CO1	CO2	CO3	CO4	CO5
CO1	★	★	★		★
CO2		★	★		★
CO3	★		★	★	★
CO4	★	★	★	★	
CO5	★	★		★	★

CO6			★	★	★
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8. ER-2020 D Pharm Syllabus – Part II

S. No.	Course Code	Name of the Course	Total Hours	Hours per Week
1.	ER20-21T	Pharmacology – Theory	75	3
2.	ER20-21P	Pharmacology – Practical	50	2
3.	ER20-22T	Community Pharmacy & Management – Theory	75	3
4.	ER20-22P	Community Pharmacy & Management – Practical	75	3
5.	ER20-23T	Biochemistry & Clinical Pathology – Theory	75	3
6.	ER20-23P	Biochemistry & Clinical Pathology – Practical	50	2
7.	ER20-24T	Pharmacotherapeutics – Theory	75	3
8.	ER20-24P	Pharmacotherapeutics – Practical	25	1
9.	ER20-25T	Hospital & Clinical Pharmacy – Theory	75	3
10.	ER20-25P	Hospital & Clinical Pharmacy – Practical	25	1
11.	ER20-26T	Pharmacy Law & Ethics	75	3

PHARMACOLOGY – THEORY

Course Code: ER20-21T

75 Hours (3 Hours/week)

Scope: This course provides basic knowledge about different classes of drugs available for the pharmacotherapy of common diseases. The indications for use, dosage regimen, routes of administration, pharmacokinetics, pharmacodynamics, and contraindications of the drugs discussed in this course are vital for successful professional practice.

Course Objectives: This course will discuss the following:

1. General concepts of pharmacology including pharmacokinetics, pharmacodynamics, routes of administration, etc.
2. Pharmacological classification and indications of drugs
3. Dosage regimen, mechanisms of action, contraindications of drugs
4. Common adverse effects of drugs

Course Outcomes: Upon successful completion of this course, the students will be able to

1. **Appraise**(5) the basic concepts of pharmacokinetics and pharmacodynamics
2. **Compare**(2) and **choose**(4) various classes and drugs of choices for any given disease condition
3. **Predict**(6) & Advice the dosage regimen, route of administration and contraindications for a given drug
4. **Appraise**(5) the common adverse drug reactions
5. **Criticize**(5) the co-relation of pharmacology with other biomedical sciences

Course Objective / Course Outcomes Mapping					
Course Objective	Course Outcomes (CO)				
	CO1	CO2	CO3	CO4	CO5
CO1	★	★		★	
CO2		★	★	★	★
CO3	★	★	★	★	★
CO4	★		★	★	★

PHARMACOLOGY – PRACTICAL

Course Code: ER20-21P

50 Hours (2 Hours/week)

Scope: This course provides the basic understanding about the uses, mechanisms of actions, dose dependent responses of drugs in simulated virtual animal models and experimental conditions.

Course Objectives: This course will demonstrate / provide hands-on experience in the virtual platform using appropriate software on the following

1. Study of pharmacological effects of drugs like local anaesthetics, mydriatic and mitotic on rabbit eye
2. Screening the effects of various drugs acting in the central nervous system
3. Study of drug effects on isolated organs / tissues
4. Study of pyrogen testing on rabbit

Course Outcomes: Upon successful completion of this course, the students will be able to

1. **Analyze** (4) and report the local anaesthetic, mydriatic and mitotic effects of the given drug on the rabbit eye
2. **Choose** (6) appropriate animal experiment model to study the effects of the given drugs acting on the central nervous system and submit the report
3. **Examine** (4) the effects of given tissues (simulated) on isolated organs / tissues and interpret the results
4. **Interpret** (5) the dose dependent responses of drugs in various animal experiment models
5. **Estimate** (5) the effect of drugs on animals by simulated experiment

Course Objective / Course Outcomes Mapping					
Course Objective	Course Outcomes (CO)				
	CO1	CO2	CO3	CO4	CO5
CO1		★	★	★	★
CO2	★	★	★		★
CO3	★		★	★	
CO4	★	★		★	★

COMMUNITY PHARMACY AND MANAGEMENT – THEORY

Course Code: ER20-22T

75 Hours (3 Hours/week)

Scope: The course is designed to impart basic knowledge and skills to provide various pharmaceutical care services to patients and general practitioners in the community setup.

Course Objectives: This course will discuss the following

1. Establishing and running a community pharmacy and its legal requirements
2. Professional aspects of handling and filling prescriptions
3. Patient counselling on diseases, prescription and or non-prescription drugs
4. Scope for performing basic health screening in community pharmacy settings

Course Outcomes: Upon successful completion of this course, the students will be able to

1. **Examine**(4) the establishment, legal requirements and effective administration of a community pharmacy
2. Professionally **rate**(5) prescriptions and dispense medications
3. **Elaborate** (6) & Counsel patients about the disease, prescription and or non-prescription drugs
4. **Carry out**(3) basic health screening on patients and interpret the reports in the community pharmacy settings
5. **Justify**(5) the role of pharmacists in promoting the safe practices during self-medication

Course Objective / Course Outcomes Mapping					
Course Objective	Course Outcomes (CO)				
	CO1	CO2	CO3	CO4	CO5
CO1		★	★	★	★
CO2	★	★	★		★
CO3	★		★	★	
CO4	★	★		★	★

COMMUNITY PHARMACY AND MANAGEMENT – PRACTICAL

Course Code: ER20-22P

75 Hours (3 Hours/week)

Scope: The course is designed to train the students and improve professional skills to provide various pharmaceutical care services in the simulated community pharmacy.

Course Objectives: This course will train the students in the following

1. Professional handling and filling prescriptions
2. Patient counselling on diseases and minor ailments
3. Patient counselling on prescription and / or non-prescription drugs
4. Preparation of counselling materials such as patient information leaflets
5. Performing basic health screening tests

Course Outcomes: Upon successful completion of this course, the students will be able to

1. **Interpret**(5) and fill prescriptions in a professional manner
2. **Inspect**(4) & Counsel patients on various diseases and minor ailments
3. **Inspect** (4) & Counsel patients on prescription and or non-prescription drugs
4. **Design**(6) and prepare patient information leaflets
5. **Carry out** (3) basic health screening tests

Course Objective / Course Outcomes Mapping					
Course Objective	Course Outcomes (CO)				
	CO1	CO2	CO3	CO4	CO5
CO1	★		★	★	★
CO2		★	★	★	
CO3	★		★	★	
CO4	★	★		★	★
CO5	★	★	★		★

BIOCHEMISTRY & CLINICAL PATHOLOGY – THEORY

Course Code: ER20-23T

75 Hours (3 Hours/week)

Scope: This course is designed to impart basic knowledge on the study of structure and functions of biomolecules and the chemical processes associated with living cells in normal and abnormal states. The course also emphasizes on the clinical pathology of blood and urine.

Course Objectives: This course will discuss the following at the fundamental level

1. Structure and Functions of biomolecules
2. Catalytic activity, diagnostic and therapeutic importance of enzymes
3. Metabolic pathways of biomolecules in health and illness (metabolic disorders)
4. Biochemical principles of organ function tests and their clinical significance
5. Qualitative and quantitative determination of biomolecules / metabolites in the biological sample
6. Clinical pathology of blood and urine

Course Outcomes: Upon successful completion of this course, the students will be able to

1. **Explain** (2) the functions of biomolecules
2. **Conclude** (4) the various functions of enzymes in the human system
3. **Explain**(2) the metabolic pathways of biomolecules in both physiological and pathological conditions
4. **Justify** (5) the principles of organ function tests and their clinical significances
5. **Estimate**(5) the biomolecules / metabolites in the given biological samples, both qualitatively and quantitatively
6. **Examine** (4) the clinical pathology of blood and urine

Course Objective / Course Outcomes Mapping						
Course Objective	Course Outcomes (PO)					
	CO1	CO2	CO3	CO4	CO5	CO6
CO1	★		★	★		★
CO2		★	★		★	

CO3	★	★		★	★	★
CO4	★		★			★
CO5		★		★	★	
CO6	★		★			★

BIOCHEMISTRY & CLINICAL PATHOLOGY – PRACTICAL

Course Code: ER20-23P

75 Hours (3 Hours/week)

Scope: This course is designed to train the students in the qualitative testing of various biomolecules and testing of biological samples for determination of normal and abnormal constituents

Course Objectives: This course will train and provide hands-on experiences on the following

1. Qualitative determination of biomolecules / metabolites in simulated biological samples
2. Determination of normal and abnormal constituents of simulated blood and urine samples

Course Outcomes: Upon successful completion of this course, the students will be able to

1. Qualitatively **estimate**(5) the biomolecules / metabolites in the given biological samples
2. Determine the normal and abnormal constituents in blood and urine samples and **interpret**(5) the results of such testing
3. **Identify**(1) and **estimate**(5) the types of Protein present in the unknown sample
4. **Explain**(2) the methods of preparation of buffers of different pH & their measurement
5. **Predict**(6) the amount of essential components present in the given sample of blood

Course Objective / Course Outcomes Mapping					
Course Objective	Course Outcomes (CO)				
	CO1	CO2	CO3	CO4	CO5
CO1	★	★		★	
CO2	★	★	★	★	★
CO3		★	★	★	★
CO4	★		★		★

PHARMACOTHERAPEUTICS - THEORY

Course Code: ER20-24T

75 Hours (3 Hours/week)

Scope: This course is designed to impart basic knowledge on etiopathogenesis of common diseases and their management along with quality use of medicines.

Course Objectives: This course will discuss about

1. Etiopathogenesis of selected common diseases and evidence-based medicine therapy
2. Importance of individualized therapeutic plans based on diagnosis
3. Basic methods for assessing the clinical outcomes of drug therapy

Course Outcomes: Upon successful completion of this course, the students will be able to

1. Help **assessing(5)** the subjective and objective parameters of patients in common disease conditions
2. Assist other healthcare providers to **analyse(4)** drug related problems and **provide** (3) therapeutic interventions
3. Participate in **planning(6)** the rational medicine therapy for common diseases
4. **Design(6)** and deliver discharge counselling for patients
5. **Understand(2)** Standard Treatment Guidelines

Course Objective / Course Outcomes Mapping					
Course Objective	Course Outcomes (CO)				
	CO1	CO2	CO3	CO4	CO5
CO1	★		★	★	
CO2		★	★	★	★
CO3	★	★	★		★

PHARMACOTHERAPEUTICS – PRACTICAL

Course Code: ER20-24P

25 Hours (1 Hour/week)

Scope: This course is designed to train the students in the basic skills required to support the pharmaceutical care services for selected common disease conditions.

Course Objectives: This course will train the students on

1. How to prepare a SOAP (Subjective, Objective, Assessment and Plan) note for clinical cases of selected common diseases
2. Patient counselling techniques/methods for common disease conditions
3. Able to identify the abnormal physiology of individual with specific disease states.
4. Can perform the patient counseling effectively

Course Outcomes: Upon successful completion of this course, the students will be able to

1. **Develop**(3) the SOAP (Subjective, Objective, Assessment and Plan) notes for the given clinical cases of selected common diseases
2. **Support** (5) & Counsel the patients about the disease conditions, uses of drugs, methods of handling and administration of drugs, life-style modifications and monitoring parameters.
3. Diagnose the disease by monitoring the clinical manifestations of the patient and **formulate**(6) individualized therapy
4. Able to **provide**(3) rational drug therapy to the patient
5. Able to **interpret**(5) the data from diagnostic tools.

Course Objective / Course Outcomes Mapping					
Course Objective	Course Outcomes (CO)				
	CO1	CO2	CO3	CO4	CO5
CO1	★		★	★	
CO2	★	★	★	★	★
CO3		★		★	★
CO4	★	★	★		★

HOSPITAL AND CLINICAL PHARMACY – THEORY

Course Code: ER20-25T

75 Hours (3 Hours/week)

Scope: This course is designed to impart fundamental knowledge and professional skills required for facilitating various hospital and clinical pharmacy services.

Course Objectives: This course will discuss and train the students in the following

1. Hospital and Hospital Pharmacy organization and set-ups
2. Basics of hospital pharmacy services including the procurement, supply chain, storage of medicines and medical supplies
3. Basics of clinical pharmacy including introduction to comprehensive pharmaceutical care services
4. Basic interpretations of common laboratory results used in clinical diagnosis towards optimizing the drug therapy

Course Outcomes: Upon successful completion of this course, the students will be able to

1. **Explain**(2) about the basic concepts of hospital pharmacy administration
2. **Assess**(5) the supply chain and distribution of medicines within the hospital settings
3. Assist the other healthcare providers in Designing(6) drug therapy and **judging**(5) drug related problems
4. **Interpret**(5) common lab investigation reports for optimizing drug therapy
5. **Understand**(2) Inventory control technique

Course Objective / Course Outcomes Mapping					
Course Objective	Course Outcomes (CO)				
	CO1	CO2	CO3	CO4	CO5
CO1	★	★	★		★
CO2		★	★	★	
CO3	★	★		★	★
CO4	★		★	★	★

HOSPITAL AND CLINICAL PHARMACY – PRACTICAL

Course Code: ER20-25P

25 Hours (1 Hour / Week)

Scope: This course is designed to train the students to assist other healthcare providers in the basic services of hospital and clinical pharmacy.

Course Objectives: This course will train the students with hands-on experiences, simulated clinical case studies in the following

1. Methods to systematically approach and respond to drug information queries
2. How to interpret the common laboratory reports to understand the need for optimizing the dosage regimen
3. How to report the suspected adverse drug reactions to the concerned authorities
4. Uses and methods of handling various medical/surgical aids and devices
5. How to interpret the drug-drug interactions in the treatment of common diseases.

Course Outcomes: Upon completion of the course, the students will be able to

1. Professionally **justify**(5) and answer the drug information queries
2. **Interpret**(5) the common laboratory reports
3. **Disprove**(5) suspected adverse drug reactions using standard procedures
4. **Understand**(2) the uses and methods of handling various medical/surgical aids and devices
5. **Interpret**(5) and **rate**(5) the drug-drug interactions in common diseases for optimizing the drug therapy

Course Objective / Course Outcomes Mapping					
Course Objective	Course Outcomes (CO)				
	CO1	CO2	CO3	CO4	CO5
CO1	★		★		★
CO2		★	★	★	★
CO3	★	★	★	★	★
CO4	★	★		★	
CO5		★	★		★

PHARMACY LAW AND ETHICS – THEORY

Course Code: ER20-26T

75 Hours (3 Hours/week)

Scope: This course is designed to impart basic knowledge on several important legislations related to the profession of pharmacy in India

Course Objectives: This course will discuss the following

1. General perspectives, history, evolution of pharmacy law in India
2. Act and Rules regulating the profession and practice of pharmacy in India
3. Important code of ethical guidelines pertaining to various practice standards
4. Brief introduction to the patent laws and their applications in pharmacy

Course Outcomes: Upon successful completion of this course, the students will be able to

1. **Explain**(2) the history and evolution of pharmacy law in India
2. **Interpret**(5) the act and rules regulating the profession and practice of pharmacy in India
3. **Justify**(5) the various codes of ethics related to practice standards in pharmacy
4. **Interpret**(5) the fundamentals of patent laws from the perspectives of pharmacy
5. **Defend** (5) Various indian pharmaceutical acts and laws

Course Objective / Course Outcomes Mapping					
Course Objective	Course Outcomes (CO)				
	CO1	CO2	CO3	CO4	CO5
CO1	★	★			★
CO2			★	★	★
CO3	★	★		★	★
CO4	★		★	★	