Study Scheme & Syllabus of Post Graduate Diploma in Herbal Drugs

Batch 2018 onwards

By

Board of Study Pharmacy

Department of Academics

IK Gujral Punjab Technical University

First Semester

Course Code	Course Type	Course Name	Load			Marks			Credits
			L	T	P	Internal	External	Total	
PGDHD101-18	Core Theory-I	Taxonomy and Cultivation of Medicinal Plants	4	-	-	40	60	100	4
PGDHD102-18	Core Theory-II	Ethnomedicine	4	-	-	40	60	100	4
PGDHD103-18	Core Theory-III	Pharmacognosy	4	-	-	40	60	100	4
PGDMAT104-18	Core Theory-IV	Modern Analytical Techniques	4	-		40	60	100	4
PGDHD105-18	Core Practical-I	Herbal Drugs Lab	-	-	4	60	40	100	2
PGDMAT106-18	Core Practical-II	Modern Analytical Techniques Lab		-	4	60	40	100	2
PGDHD107-18	Skill Enhancement	Seminar/Journal Club	4	-	-	100	-	100	4
PGDHD108-18	Skill Enhancement	Project-I	-	-	4	-	100	100	2
		Total	**20**		**12**	**380**	**420**	**800**	**26**

1st SEMESTER

Course Code	Course Title	Teaching Load			Marks		Exam (hrs)		Credits
		L	T	P	Int.	Ext.	Int.	Ext.	
PGDHD 101-18	Taxonomy and Cultivation of Medicinal Plants	4	-	-	40	60	1.5	3	4

Scope: The subject includes fundamentals of plant taxonomy, plant parts, classification of plants; study of important plant families; cultivation of medicinal plants, harvesting and storage, etc.

Course Outcomes: Upon completion of the course, the student shall be able to know the

1. Basics of plant classification
2. Morphology and general anatomy of various plant parts
3. Floral characters of medicinally important plant families along with important medicinal plants
4. Methods of cultivating plants
5. Use of pesticides and plant growth regulators
6. Methods of harvesting and storing plant drugs
7. Basics of commerce of herbal drugs

Module I **15 Hrs**

Morphology and general anatomy of medicinally important plant parts: Roots, Stem and its modifications, Barks, Leaves, Flowers, Fruits, Seeds.

Module II **05 Hrs**

Taxonomy: Elementary knowledge of Binomial nomenclature, Outline of Bentham and Hooker classification, Preparation of herbarium specimens.

Module III **15 Hrs**

Study of some medicinally important families (diagnostic features with at least three examples of species of medicinal use): Paparveraceae, Rutaceae, Fabaceae, Apiaceae,Rubiaceae, Asteraceae, Solanaceae, Scrophulariaceae, Lamiaceae, Liliaceae.

Module IV **10Hrs**

Cultivation methods, Herbal pesticides, Plant growth regulators. Harvesting and Storage. Marketing and general aspects of export of medicinally important plants.

Recommended Books (Latest Edition)

1. A Class Book of Botany. A.C. Dutta. Oxford University Press.

2. Pharmacognosy - G. E. Trease and W.C. Evans. Saunders Edinburgh, New York.
3. Textbook of Pharmacognosy by T.E. Wallis.
4. Cultivation of Medicinal Plants by C.K. Atal & B.M. Kapoor.

Course Code	Course Title	Teaching Load			Marks		Exam (hrs)		Credits
		L	T	P	Int.	Ext.	Int.	Ext.	
PGDHD 102-18	Ethnomedicine	4	-	-	40	60	1.5	3	4

Scope: The subject includes important aspects of ethnomedicine like use in health care, study of important traditional medicines and formulations.

Course Outcomes: Upon completion of the course, the student shall be able to know

1. Definition, history and scope of ethnomedicine
2. Difference between folk and traditional medicines
3. Use of some routinely used Ayurvedic drugs and formulations
4. Important ethnomedicines of Punjab

Module I **10 Hrs**

Ethnomedicine: Definition, history and scope. Collection of ethnic information.Importance of medicinal plants: Role in human health care. Introduction to basic concepts of folk medicine and Ayurveda, Naturopathy and Yoga: methods of disease diagnosis and treatment.

Module II **15 Hrs**

Study of some Ayurvedic drugs: Bael, Pipal, Haldi, Guggul, Ashoka, Shatavar, Sarapgandha, Kalmegh, Gokhru, Punarnava, Ashwagandha, Jatamansi, Isabgol, Vasaka and Shilajit.

Module III **10 Hrs**

Introduction to Ayurvedic formulations with methods of preparation: Churna, Vati, Avleh, Asava, Arishta, Taila and Bhasma.

Module IV **10 Hrs**

Traditional knowledge and utility of some medicinal plants of Punjab: Neem, Curry Patta, Giloe, Kachnar, Arjun, Harad, Bahera, Amla, Amaltas, Banyan, Tulsi, Sadabahar and mint.

Recommended Books (Latest Edition)

1. Awadesh N, Ghoeami A and Sharma R, Indigenous Health Care and Ethno-medicine, Sarup and Sons.
2. Glimpses of Indian Ethano-Pharmacology by P. Pushpangadam. Ulf Nyman. V. George Tropical Botanic Garden & Research Institute.
3. Textbook of Pharmacognosy by C. K. Kokate, Purohit, Ghokhale, Nirali Prakashan.

Course Code	Course Title	Teaching Load			Marks		Exam (hrs)		Credits
		L	T	P	Int.	Ext.	Int.	Ext.	
PGDHD 103-18	Pharmacognosy	4	-	-	40	60	1.5	3	4

Scope: The subject includes definition and scope of Pharmacognosy; traditional systems of therapy; classification methods of crude drugs, preparation of herbal formulations, organoleptic study of medicinally important plant parts, analytical pharmacognosy, etc.

Course Outcomes: Upon completion of the course, the student shall be able to know

1. Definition, history and scope of Pharmacognosy
2. Different systems of classifying crude drugs
3. Organoleptic analysis of crude drugs
4. About drug adulteration and methods of detecting the same
5. Phytochemical and biological screening of herbal drugs

Module I **05 Hrs**

Definition and history, and scope of Pharmacognosy. Systems of Indian Medicines:Ayurveda, Unani, Siddha and Homeopathy.Classification of Crude drugs: Morphological, Taxonomical, Chemical and Pharmacological.

Module II **15 Hrs**

Preparation of crude drugs for commerce. Preparation of herbal infusions, decoctions, lotions, insect repellents, suppositories, tinctures, syrups, poultices, plasters, ointments, oils and salves. Surgical fibres, sutures and dressings.

Module III **15 Hrs**

Organoleptic study of Rauwolfia, Ipecac, Jatamansi, Liqurice, Ginger, Garlic, Turmeric, Neem, Senna, Tulsi, Cinchona, Cinnamon, Arjun, Harad, Bahera, Amla, Castor, Nux-vomica and Isabgol.

Module IV **10 Hrs**

Analytical Pharmacognosy: Drug adultration and its detection. Introduction to phytochemical screening (alkaloids, polyphenolic compounds and glycosides). Introduction to biological testing of herbal drugs (analgesics, anti-inflammatory and antianxiety agents).

Recommended Books (Latest Edition)

1. Pharmacognosy - G. E. Trease and W.C. Evans. Saunders Edinburgh, New York.
2. Pharmacognosy-Tyler, Brady, Robbers.
3. Modem Methods of Plant Analysis- Peach & M.V. Tracey, Vol. I&II.

4. Textbook of Pharmacognosy by T.E. Wallis.
5. Textbook of Pharmacognosy, C. K. Kokate, Purohit, Ghokhale, Nirali Prakasshan.

Course Code	Course Title	Teaching Load			Marks		Exam (hrs)		Credits
		L	T	P	Int.	Ext.	Int.	Ext.	
PGDMAT 104-18	Modern Analytical Techniques	4	-	-	40	60	1.5	3	4

Scope: This subject deals with the application of instrumental methods in qualitative and quantitative analysis of drugs. This subject is designed to impart advanced knowledge on the principles and instrumentation of spectroscopic and chromatographic hyphenated techniques. This also emphasizes on theoretical and practical knowledge on modern analytical instruments that are used for drug testing.

Course Outcomes: Upon completion of the course, the student shall be able to know

1. Analysis of drugs using various analytical instruments
2. Understand the chromatographic separation and analysis of drugs
3. Understand the advanced instruments used and its applications in drug analysis

Module 01 **08 Hrs**

a. Pharmaceutical analysis-Definition and scope , Different techniques of analysis , Methods of expressing concentration , Primary and secondary standards, Preparation and standardization of various molar and normal solutions- Oxalic acid, sodium hydroxide, hydrochloric acid, sodium thiosulphate, sulphuric acid, potassium permanganate and ceric ammonium sulphate
b. Pharmacopoeia, Sources of impurities in medicinal agents,limit tests.
c. Calibration and validation-as per ICH and USFDA guidelines Calibration of following Instruments Electronic balance, UV-Visible spectrophotometer, IR spectrophotometer, Fluorimeter, Flame Photometer, HPLC and GC

Module 02 **11 Hrs**

a. UV Visible spectroscopy: Introduction, Electronic transitions, chromophores, auxochromes, spectral shifts, solvent effect on absorption spectra, Beer and Lambert's law, Derivation and deviations. Instrumentation - Sources of radiation, wavelength selectors, sample cells, detectors- Photo tube, Photomultiplier tube, Photo voltaic cell, Silicon Photodiode. Applications
b. IR spectroscopy: Introduction, fundamental modes of vibrations in poly atomic molecules, sample handling, factors affecting vibrations Instrumentation - Sources of radiation, wavelength selectors, detectors - Golay cell, Bolometer, Thermocouple, Thermister, Pyroelectric detector and applications

Module 03 **11 Hrs**

a. Nuclear Magnetic Resonance spectroscopy: Principles of H-NMR and C-NMR, chemical shift, factors affecting chemical shift, coupling constant, Spin - spin coupling, relaxation, instrumentation and applications
b. Mass Spectrometry: Principles, Fragmentation, Ionization techniques – Electron impact, chemical ionization, MALDI, FAB, Analyzers-Time of flight and Quadrupole, instrumentation, applications

Module 04 **15 Hrs**

a. Introduction to chromatography
b. Thin layer chromatography- Introduction, Principle, Methodology, Rf values, advantages, disadvantages and applications.
c. Paper chromatography-Introduction, methodology, development techniques, advantages, disadvantages and applications
d. Gas chromatography - Introduction, theory, instrumentation, derivatization, temperature programming, advantages, disadvantages and applications
e. High performance liquid chromatography (HPLC) - Introduction, theory, instrumentation, advantages and applications.

Recommended Books (Latest Edition)

1. Instrumental Methods of Chemical Analysis by B.K Sharma
2. Organic spectroscopy by Y.R Sharma
3. Vogel's Text book of Quantitative Chemical Analysis by A.I. Vogel
4. Practical Pharmaceutical Chemistry by A.H. Beckett and J.B. Stenlake
5. Organic spectroscopy by William Kemp
6. Quantitative Analysis of Drugs in Pharmaceutical Formulations by P. D. Sethi
7. Spectrophotometric identification of Organic Compounds by Silverstein
8. Text book of Pharmaceutical Analysis Vol, II and III by Arora and Arora S. Vikas and company Jalandhar

Course Code	Course Title	Teaching Load			Marks		Exam (hrs)		Credits
		L	T	P	Int.	Ext.	Int.	Ext.	
PGDHD 105-18	Herbal Drugs Lab	-	-	4	60	40	6	6	2

1. Morphological study of various plant parts.
2. Study of general anatomy of various plant parts through permanent microscopic slides.
3. Taxonomic study of at least one representative of the families covered in theory.
4. Preparation of herbarium specimens of at least ten medicinal plants studied in theory.
5. Study of organoleptic characters of the plants prescribed in the syllabus.
6. Chemical tests for identification of honey, castor oil and their adulterants.
7. Preparation of some herbal formulations mentioned in the syllabus.
8. Phytochemical screening for alkaloids, polyphenolic compounds and glycosides.

Recommended Books (Latest editions)

1. Evans WC, Trease and Evans Pharmacognosy, WB Saunders Limited.
2. Taylor VE, Brady LR, Robbers JE, Pharmacognosy, KM Varghese Company.
3. Kokate CK, Practical Pharmacognosy, Vallabh Prakashan.

Course Code	Course Title	Teaching Load			Marks		Exam (hrs)		Credits
		L	T	P	Int.	Ext.	Int.	Ext.	
PGDMAT 106-18	Modern Analytical Techniques Lab	-	-	4	60	40	6	6	2

1. Measurement of absorption maxima of some Pharmacopoeial drugs
2. Separation of compounds of mixture by TLC
3. Demonstration experiment on HPLC
4. Demonstration experiment on GC
5. Assay of Pharmacopoeial drugs (minimum 5)

Course Code	Course Title	Teaching Load			Marks		Exam (hrs)		Credits
		L	T	P	Int.	Ext.	Int.	Ext.	
PGDHD 108-18	Project-I	-	-	4	100	-	1	-	2

The candidate shall prepare a report on a topic of recent development assigned by the mentor. The candidate shall also give a presentation to be evaluated by both internal and external examiners.

Evaluation Scheme

Report	:	25 marks
Presentation	:	25 marks
Viva-Voce	:	50 marks