SENGAMALA THAYAAR EDUCATIONAL TRUSTWOMEN'S COLLEGE
(AUTONOMOUS)
(Accredited by NAAC & An ISO 9001: 2015 Certified Institution)
SUNDARAKKOTTAI, MANNARGUDI-614 016, TAMIL NADU, S. INDIA

DEPARTMENT OF BIOCHEMISTRY

DETAILS OF VALUE ADDED COURSES OFFERED

ACADEMIC YEAR 2024-2025

S.No.	Class	Title of the Course	Course Code
1.	I B.Sc., Biochemistry	Traditional Medicine	U24BCVA21
2.	II B.Sc., Biochemistry	Herbal Product Development	U23BCVA32
3.	III B.Sc., Biochemistry	Nutraceuticals	23BCVA3
4.	I M.Sc., Biochemistry	Know Your Medicine	P24BCVA21
5.	II M.Sc., Biochemistry	Herbs and Drug Action	P23BCVA32

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DEPARTMENT OF BIOCHEMISTRY
B.Sc., BIOCHEMISTRY

VAC I: Traditional Medicine

Ins. Hours: 30 **Course Code**: U24BCVA21

OBJECTIVES

- To impart knowledge of Herbal medicine as the basic objective of Education
- To develop a scientific attitude to make students open minded, critical and curious
- To make them able to identify medicinal plants (family/genus-level)

UNIT-I: Introduction (05 Hours)

Definition of Herbal drug, Importance of Herbal therapies, Herbal verses conventional drugs, Safety in herbal drugs.

UNIT-II: Phytoconstituents (07 Hours)

Herbs used as nutraceuticals and healing agents; Isolation, identification tests and estimation methods such as HPLC, HPTLC.

UNIT-III: Application of Herbal Medicines (05 Hours)

Making and using herbal medicines for common ailments like cold, skin infections and Diarrhea.

UNIT-IV: Quality Control of Herbal Medicines (07 Hours)

Quality Control and Quality Assurance of Herbal ingredients as per W.H.O.Guidelines, Ash value, Extractable matter and Pesticide residues.

UNIT-V: Evaluation of Herbal Extracts & Herbal Drug Processing (06 Hours)

Qualitative and Quantitative estimation of active principles from standardized extract by HPTLC.

Total Lecture Hours- 30

COURSE OUTCOME

The students will be able to,

1. Develop skill in practical work, experiments, equipment's and laboratory use along with collection and interpretation of herbal products and their utilization.
2. Make aware of natural resources and environment and the importance of conserving the same.
3. Demonstrate understanding of the importance of medicinal plants among different cultures through clear, logical writing.
4. Cultures approach plant use in different ways and how plants and people interact.

5. Apply basic ethnobotanical techniques to the study of a specific cultural use of medicinal plants.

TEXT BOOK(S)

1. Kokate CK and Purohit DP. Textbook of Pharmacognosy, Nirali Prakashan, Pune
2. Staba EJ. Plant Tissue Culture as a source of Bio-Medicinals
3. Trease GE. and Evans WE., Pharmacognosy Baillere Tindall, Eastbourne
4. Tyler VE, Brady LR and Robbers JE. Pharmacognosy Len & Febiger, Philadelphia
5. Wallis TE. Pharmacognosy, CBS Publisher, New Delhi

REFERENCE BOOK(S)

1. William C. Evans, 2009. Pharmacognosy. 16th edition. Saunders Limited, USA.
2. Indian Herbal Pharmacopeia, 2002. Indian Drug Manufacturers Association, India
3. Quality Control methods for medicinal plant material, 1998. WHO, Geneva
4. Pulak Km Mukherjee, 2019. Quality control of herbal drugs. 1st edition, Elsevier, USA.
5. Michael Meguffin, Christopher Hobbs, 1997. Botanical safety handbook. Herbal products association, USA.

E-RESOURCES

1. https://www.pdfdrive.com/biochemistry-books.html
2. https://www.ncbi.nlm.nih.gov/books/NBK92773/
3. https://depts.washington.edu/pse406/notes.htm
4. https://www.intechopen.com/books/herbal-medicine/introductory-chapter- introduction-to-herbal-medicine
5. https://www.ncbi.nlm.nih.gov/pmc/articles/PMC6806606/

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VAC II: Herbal Product Development

Ins. Hrs: 30 **Course Code:** U23BCVA32

OBJECTIVES

- To know the modern extraction techniques, characterization and identification of the herbal drugs.
- To understand the preparation and development of herbal formulation.

UNIT-I:General Methods of Processing of Herbs (06 Hours)

Definition, sources, identification and authentification of herbs. Different methods of processing of herbs like collection, harvesting, garbling, packing and storage conditions. Methods of drying Natural and artificial drying methods with their merits and demerits.

UNIT-II: Methods of Preparation of Extracts (06 Hours)

Principles of extraction and selection of suitable extraction method. Different methods of extraction including maceration, percolation, hot continuous extraction, supercritical fluid extraction.

UNIT- III: Standardization of Herbal Raw materials and Extracts (06 Hours)

Standardization of herbal raw materials including Pharmacognostical, physical, chemical and biological methods with examples. Standardization of herbal extracts, physical, chemical and spectral analysis.

UNIT- IV: Selection of herbal ingredients (06 Hours)

Different dosage forms of herbal drugs. Evaluation of different dosage forms. Stability studies ofherbal formulations. Good practices in collection of plant materials.

UNIT- V: Herbal Cosmetics (06 Hours)

Cosmetics preparations: Incorporating the herbal extracts in various cosmetic formulations like Skin care preparations (Creams and Lotions), Hair care preparations (Hair oils and Hair shampoos) and Beautifying preparations.(Lipsticks, Face powders and Nail polish).

Total Lecture Hours- 30

COURSE OUTCOME

The Students are able to,

1. Understand the processing of herbs
2. Acquire knowledge on procedures of preparation of extracts
3. Describe various methods on standardization of Herbs
4. Explain the selection of herbal ingredients
5. Illustrate various key ingredients and basic science to develop cosmetics

TEXT BOOK(S)

1. Choudhary, R.D. Herbal drug industry, Ist edition, 1996, eastern publisher, New Delhi:
2. Kumar, N.C. An Introduction to Medical botany and Pharmacognosy. 1993, Emkay Publications,New Delhi
3. Pulok K. Mukarjee, Quality control of herbal drugs, Ist edition, Business horizonsPharmaceutical publisher, New Delhi, 2002

REFERENCE BOOK(S)

1. Robert Verpoorte, Pulok K. Mukharjee.GMP for Botanicals - Regulatory and Qualityissues on Phytomedicine Business horizons, 2003, New Delhi, First edition.
2. Kokate C.K., Purohit, Gokhlae. Text book of Pharmacognosy, 1996, 4th edition, Nirali Prakashan.
3. Rao, A.P. Herbs that heal. 1999, Diamond Pocket Books (P) Ltd., New Delhi.

E-RESOURCES

1. https://www.routledge.com/Herbal-Product-Development-Formulation-and- Applications/Sharma-Keservani-Gautam/p/book/9781774638958
2. https://www.researchgate.net/publication/347216284_Herbal_Food_Product_Development_and_Characteristics
3. https://www.hindawi.com/journals/ecam/2019/4935786/
4. https://www.researchgate.net/publication/235944029_Herbal_Cosmetics_Used_for_Skin_and_Hair

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VAC III: Nutraceuticals

Ins. Hours: 30 **Course Code**: 23BCVA3

OBJECTIVES

- To provide Basic knowledge about nutraceuticals
- To understand the health benefits of nutraceuticals
- To apply basic techniques for the production of nutraceuticals

UNIT-I: Over view of nutraceuticals (05 Hours)

Introduction to Nutraceuticals - Historical Perspective, Classification, Sources, Scope and Future Prospects.

UNIT- II: Over view of Phytonutracuticals (06 Hours)

Introduction to Phytonutracutical. Classification - Plant secondary metabolites, Extraction and purification of Phytonutracuticals.

UNIT-III: Probiotics, prebiotics and synbiotics (06 Hours)

Health benefits Probiotics, prebiotics and synbiotics - principle, mechanism, production technology. Role of nutraceuticals in management of health and diseases.

UNIT-IV: Extraction and quantification of Nutraceuticals (06 Hours)

Extraction and quantification of polyphenols, flavonoids, saponins and alkaloids.

UNIT-V: Effects of nutraceuticals on other sciences (07 Hours)

Relation of Nutraceutical with other Sciences: Medicine, Human Physiology, Genetics, Food Technology.

Total Lecture Hours- 30

COURSE OUTCOME

The students are able to,

1. Know about basic definition, classification of nutraceuticals
2. Learn source, chemistry and uses of several natural phytonutraceuticals
3. Understand the effect of probiotics, prebiotics and synbiotics to maintain healthy life
4. Gain knowledge on extraction and quantification of Nutraceuticals
5. Acquire knowledge of nutraceuticals on other sciences

TEXT BOOK(S)

1. Birn AE., Pillay Y & Holtz T. 2009. Textbook of international health: Global health in a dynamic world, 3rd edition, Oxford University Press Publishers, England.
2. Krishna Das KV. 2013. Clinical Medicine (A Textbook of Clinical Methods and Laboratory Investigations), 4th edition, Jaypee Brothers Medical publishers, Chennai, Tamil Nadu.
3. Seyed Mohammad Nabavi, Grazia D'Onofrio and Seyed Fazel Nabavi. 2020. Nutrients and Nutraceuticals for Active & Healthy Ageing, 1st edition, Springer Publishers, New York, USA.

REFERENCE BOOK(S)

1. Vibha Rani, Umesh and Yadav. 2018. Functional Food and Human Health, 1st edition, Springer Publishers, New York, USA.
2. William S. Hoffman. 1964. The Biochemistry of Clinical Medicine, 3rd edition, Year Book Medical Publishers, Chennai, Tamil Nadu.

E RESOURCES

1. https://egyankosh.ac.in/bitstream/123456789/99636/1/Unit-2.pdf
2. https://mis.alagappauniversity.ac.in/siteAdmin/dde-admin/uploads/2/PG_M.Sc._Home%20Science%20%E2%80%93%20Nutrition%20and%20Dietetics_365%2022_Functional%20Foods%20and%20Nutraceuticals_3572.pdf
3. https://www.slideshare.net/munnaijoy/probiotics-prebiotics-and-synbiotics

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DEPARTMENT OFBIOCHEMISTRY

M.Sc., BIOCHEMISTRY

VAC I: Know Your Medicine

Ins. Hours: 30 **Course Code**: P24BCVA21

OBJECTIVES

- To explain the various dosage forms, components, categories and labeling of Medicines
- To gain awareness about buying, using, storing and side effects of Medicines.
- To understand about various stages of drug development and about current therapies.
- To know the concepts of traditional medicines, standards for medicines and regulation of medicines.

Unit-I: Know your Medicine **(06 Hours)**

Brief description of some common Dosage forms of Medicines: Tablets, Capsules, Liquids, Suspensions, Injectable, Non-oral dosage forms etc. Components of a Medicine (Dosage form). Generic and Branded medicines. Dosage strength and How to read the label of Medicines. Idea of Batch, Manufacturing and Expiry Dates.

Unit-II: Using Medicines **(06 Hours)**

Buying and storing medicines at home. Concept of Dosage frequencies and its variation. Reasons for before or after food dose. Do's and Don'ts with special dosage forms (enteric or extended release etc). Do's and Don'ts on Medicines for chronic conditions such as Diabetes, Hypertension etc

Unit-III: Drugs or Medicine Discovery **(06 Hours)**

Some historical perspectives of drug discovery examples such as Aspirin, Penicillin, Quinine, etc. Natural drugs to Modern drugs. Safety evaluation and Efficacy Evaluation etc. Some modern advances such as Gene Therapy, Stem cell therapy etc.

Unit-IV: Herbal, Ayurvedic and Siddha Medicines **(06 Hours)**

Basic concepts. Common Traditional Remedies and Illustrative examples of popular plant drugs used in the above systems of medicines, their therapeutic constituents and uses.

Unit-V: Standards, Quality and Regulation of Medicines **(06 Hours)**

Basic concepts of quality with respect to medicinal products and how it is ensured. Outline of structure and functions of Drug Control and other relevant Bodies such as NPPA, Scope and purpose of Drugs and Cosmetic Act etc.

COURSE OUTCOMES

The students are able to,

1. Explain the various dosage forms, components, categories and labeling of Medicines.
2. Gain awareness about buying, using, storing and side effects of Medicines.
3. Understand about various stages of drug development and about current therapies.
4. Appreciate the concepts of traditional medicines, standards for medicines and regulation of medicines.
5. Extract, evaluate and label the medicines.

TEXT BOOK(S)

1. Allen, 2018, Ansel's Pharmaceutical Dosage Forms and Drug Delivery System, Wolters Kluwer India Pvt. Ltd.
2. Mohantha GP,2017,Textbook of Clinical Research, Pharma Med Press/ BSP Books
3. Wallis TE, 2005,Textbook of Pharmacognosy, CBS Indian Pharmacoepia

REFERENCE BOOK(S)

1. Faroogi AA, and Sreeramu BS, 2004. Cultivation of medicinal and aromatic crops. Revised edition, Universities Press (India) Private Limited, Hyderabad
2. Harbone JB, 1998. Phytochemical Methods: A guide to modern techniques of plant analysis. 3rdEdn, Springer (India) Private Limited, New Delhi.
3. WHO, 2002.Quality control methods for medicinal plant materials, World Health Organization, Geneva, A.I.T.B.S., Publishers and Distributors, New Delhi.
4. Halliwall B and Gutteridge J M. 1985. Free radicals in Biology and medicine. Oxford university press.

E-RESOURCES

1. https://cdsco.gov.in/opencms/opencms/en/Home/
2. https://pharmacologyonline.silae.it/files/newsletter/2009/vol3/44.Jagdish.pdf

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M.Sc., BIOCHEMISTRY

VAC II: Herbs and Drug Action

Ins. Hrs.: 30 **Course Code:** P23BCVA32

OBJECTIVES

- To know the history of herbal medicine
- To gain knowledge in allergy and allergens
- To know the basic concepts on CNS drugs
- To help in correlating between cardiovascular and respiratory diseases and their drugs
- To understand the mechanism of action of gastro intestinal and urogenital drugs

UNIT- I: History of herbal medicine (06 Hours)

History of herbal medicine - Indian system of medicine - Siddha, Ayurvedha and Unani Systems.

UNIT- II: **Allergens (05 Hours)**

Types – sources – active principles – Chemical nature – Cell modifiers – Lectins – mutagens, teratogens – Allergic reactions with known examples.

UNIT- III: Drugs acting on brain and nervous system (06 Hours)

Drugs used for Rheumatic arthritis – Psychoactive drugs – Depressants, Stimulants, hallucinogens – sources, effects, basic mechanism of action.

UNIT –IV: Drugs for Cardiovascular and Respiratory diseases (06 Hours)

Cardiovascular drugs of plant origins –anticoagulants, antihypertensive drugs – basic mechanism of action. Pulmonary / respiratory disorders – asthma – bronchitis – common cold – allergy – Remedy from plants.

UNIT- V: Drugs for Gastro intestinal and urinogenital disorders (07 Hours)

Herbal drugs used for Gastro intestinal disorders -nausea, vomiting, peptic ulcer, gastritis, constipation,Urogenetal drugs–Plant drugs used for UTI, kidney stones, Amenorrhea, dysmenorrhea, PCOS, Infertility. Antiinflammatory drugs – Cardiospermum. Anticancer drugs – Catharanthus roseus.

Total Lecture Hours-30

COURSE OUTCOME

The students are able to,

1. Understand the concepts of Indian system of medicine
2. Acquaint with the mode of actions of allergens
3. Correlate the CNS disorders and drugs
4. Assess the role of drugs in cardio vascular and respiratory diseases
5. Learn about the drugs used for urogenital disorders and anti inflammatory drugs

TEXT BOOK(S)

1. Kumar, N.C., An Introduction to Medical botany and Pharmacognosy. Emkay Publications, New Delhi. 1993
2. Rao,A.P.Herbs that heal. Diamond Pocket Books(P) Ltd., New Delhi, 1999
3. D.C. Pal & S.K. Jain Naya Prakash. Tribal medicine –206, Bidhan Sarani, Calcutta , 1998
4. Jain, 2001 Medicinal plants. National Book Trust, New Delhi
5. Agarwal,1985. Drug plants in India, Kalyani Publishers, Ludhiyana

REFERENCE BOOK(S)

1. Gokhale S.M., M.C.K.Kokate and A.P. Purohit Pharmagonosy, Nirali Prakashan
2. Bhattacharya, S.K. 1988 Hand book of medicinal plants. Pointer publishers, jaipur.
3. Acharya Vipul Rao– Herbs-that heal Diamond Pocket Books Pvt. Ltd., New Delhi
4. An introduction to Medicinal Botany and Pharmacognosy –N.C.Kumar, Emkay Publications, New delhi, 2004.
5. Indian Medicinal Plants (Vol.I– V) K.R. Kirtikar and B. D. Basu 1975.

E RESOURCES

1. https://www.jiwaji.edu/pdf/ecourse/pharmaceutical/Indian%20system%20of%20medicine.pdf
2. https://www.niehs.nih.gov/health/topics/agents/allergens
3. https://childrenswi.org/medical-care/genetics-and-genomics-program/medical-genetics/teratogens
4. https://www.researchgate.net/publication/353972383_Plants_Based_Herbal_Drugs_for_Cardiovascular_Diseases
5. https://www.researchgate.net/publication/318852059_Herbal_Remedies_for_Respiratory_Diseases_among_the_Natives_of_Madhya_Pradesh_India
6. https://www.ncbi.nlm.nih.gov/pmc/articles/PMC7365888/
7. https://www.ncbi.nlm.nih.gov/pmc/articles/PMC5297587/