FOUR YEAR UNDERGRADUATE PROGRAM (2024 – 28)
Department of Biochemistry
Course Curriculum

PART- A: Introduction			
Program: Bachelor in Science *(Honors/ Honors with Research)*		**Semester - VIII**	Session: **2024-2025**
1	**Course Code**	**BCSC-08 T**	
2	**Course Title**	**Nutraceutical Biochemistry and Functional Foods**	
3	**Course Type**	**Discipline Specific Course (Theory)**	
4	**Pre-requisite (if, any)**	As per the Program	
5	**Course Learning. Outcomes (CLO)**	*On successful completion of the course, the student shall be able to:* ➢ Understand the Nutraceuticals in the context of the human well-being. ➢ Demonstrate necessary to understand the diet-health relationships and the importance of human evidence-based nutrition. ➢ Apply regulatory aspects of functional foods and the requirements for safety and efficacy assessment of nutraceutical and functional food. ➢ Apply the use of perspectives for improving the formulation of potential functional ingredients/foods.	
6	**Credit Value**	**3 Credits**	***Credit = 15 Hours - learning & Observation***
7	**Total Marks**	**Max. Marks: 100**	**Min Passing Marks: 40**

PART -B: Content of the Course

Total No. of Teaching–learning Periods (01 Hr. per period) - 45 Periods (45 Hours)

Unit	Topics (Course contents)	No. of Period
I	**Introduction to Nutraceuticals as Science:** Historical perspective, classification, scope and future prospects.Scrutinising the term 'nutraceutical', Regulation of various countries. Medicinal Plants: Ethnomedicine in India, Applied aspects of the Nutraceutical Science. Sources of Nutraceuticals. Relation of Nutraceutical Science with other Sciences: Medicine, Human physiology, genetics, food technology, chemistry and nutrition	12
II	**Properties, structure and functions of various Nutraceuticals:** Glucosamine, Octacosanol, Lycopene, Falvanoids, Carnitine, Melatonin and Ornithine alpha, ketoglutarate.Use of proanthocyanidins, grape products, flaxseed oil as Nutraceuticals.Nutraceutical Industry and Market Information, New technologies in development of Nutraceuticals and functional foods Functional Foods, Scope of Genetic engineering, Nutritional Genomics	11
III	**Food as remedies:** Nutraceuticals bridging the gap between food and drug, Special Dietary Needs, Disease and Nutrition; Nutraceuticals in treatment for cognitive decline, Nutraceutical remedies for common disorders like Arthritis, Bronchitis, circulatory problems, hypoglycemia, Nephrological disorders, Liver disorders, Osteoporosis, Psoriasis and Ulcers etc. Brief idea about some Nutraceutical rich supplements e.g. Bee pollen, Caffeine, Green tea, Lecithin, Mushroom extract, Chlorophyll, Kelp and Spirulina etc.	11
IV	**Anti-nutritional Factors present in Foods:** Types of inhibitors present in various foods and how they can be inactivated. General idea about role of Probiotics and Prebiotics as nutraceuticals. Recent advances in techniques & feeding of substrates. Assessment of nutritional status and Recommended Daily allowances.	11
Keywords	Plant product, Active compounds, food, remedy	

Name and Signature of Convener & Members of CBoS:

PART–C: Learning Resources
Text Books, Reference Books and Others
Text Books Recommended – ➢ Stryer E.A., Biochemistry ➢ Zubay, Geoffrey L. Biochemistry, ➢ Greenberg David M. Metabolic Pathways, Vol 3 Todd and others, Clinical Diagnosis and Management, 17th Ed, ➢ Gopalan C., et al Dietary Allowances for Indians, NIH, Hyderabad.

PART -D: Assessment and Evaluation		
Suggested Continuous Evaluation Methods: **Maximum Marks: 100 Marks** **Continuous Internal Assessment (CIA): 30 Marks** **End Semester Exam (ESE): 70 Marks**		
Continuous Internal Assessment (CIA): **(By Course Teacher)**	Internal Test / Quiz-(2): **20 +20** Assignment / Seminar - **10** Total Marks - **30**	Better marks out of the two Test / Quiz + obtained marks in Assignment shall be considered against **30** Marks
End Semester Exam (ESE):	**Two section – A & B** Section A: **Q1.** Objective – **10 x1= 10** Mark; **Q2.** Short answer type- **5x4 =20 Marks** Section B: Descriptive answer type qts.,**1out of 2** from each unit-**4x10=40 Marks**	

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PART- A: Introduction			
Program: Bachelor in Science *(Honors/ Honors with Research)*		**Semester - VII**	Session: **2024-2025**
1	Course Code	BCSC-08 P	
2	Course Title	Nutraceutical Biochemistry and Functional Foods	
3	Course Type	Discipline Specific Course (Practical)	
4	Pre-requisite (if, any)	As per the Program	
5	Course Learning. Outcomes (CLO)	*On successful completion of the course, the student shall be able to:* ➢ Student will be skilled with basic Research on bioactive compounds. ➢ Understand the concept of functional foods and their role in the human health and well-being. ➢ Apply the diet and dietary components in the modulation of risk factors associated with chronic diseases (e. g cardiovascular diseases) and human health;	
6	Credit Value	1 Credits	*Credit = 30 Hours Laboratory or Field learning/Training*
7	Total Marks	Max. Marks: 50	Min Passing Marks: 20

PART -B: Content of the Course

Total No. of learning-Training/performance Periods: 30 Periods (30 Hours)		
Module	**Topics (Course contents)**	**No. of Period**
Lab./Field Training/ Experiment Contents of Course	➢ Extraction, purification and evaluation of activity of any one digestive enzyme (e.g. Beta amylase from sweet potato) ➢ Estimation of ascorbic acid from lemon & amla juice by titration method ➢ Reactions of mono, di and polysaccharides and their identification in unknown mixtures ➢ Determination of Acid value, Saponification and Iodine number of natural fats & oils. ➢ Estimation of proteins with Bradford's and other methods. ➢ Extraction and estimation of total sugars from food products (dairy product, fruit juices, bread). ➢ Identification using characteristic features of nutracuetically important plants like; Phyllanthusemblica, Curcuma longa, Zinziberofficinalis, Solanaceae (Withaniasomnifera), Aloe vera, Lilliaceae (Aliumsativum), Lamiaceae (Ocimum sanctum), Apiaceae (Coriandrumsps) and Liliaceae (Asparagus sps.), Centellaasiatica.	**30**
Keywords	Beta amylase, Acid value, ascorbic acid, Bioactive Compound	

Name and Signature of Convener & Members of CBoS:

<table>
<tr><td colspan="3">PART–C: Learning Resources</td></tr>
<tr><td colspan="3">Text Books, Reference Books and Others</td></tr>
<tr><td colspan="3">Text Books Recommended –
➤ Kuby's Immunology R.A. Goldsby, T. J Kindt and B. A. Osborne
➤ Immunology- A short Course E. Benjamini, R. Coico and G. Sunshine
➤ Immunology Roitt, Brostoff and Male</td></tr>
<tr><td colspan="3">PART -D: Assessment and Evaluation</td></tr>
<tr><td colspan="3">Suggested Continuous Evaluation Methods:
Maximum Marks: 50 Marks
Continuous Internal Assessment (CIA): 15 Marks
End Semester Exam (ESE): 35 Marks</td></tr>
<tr><td>Continuous Internal Assessment (CIA):
(By Course Teacher)</td><td>Internal Test / Quiz-(2): 10 & 10
Assignment/Seminar +Attendance - 05
Total Marks - 15</td><td>Better marks out of the two Test / Quiz + obtained marks in Assignment shall be considered against 15 Marks</td></tr>
<tr><td>End Semester Exam (ESE):</td><td>Laboratory / Field Skill Performance: On spot Assessment
A. Performed the Task based on lab. work - 20 Marks
B. Spotting based on tools & technology (written) – 10 Marks
C. Viva-voce (based on principle/technology) - 05 Marks</td><td>Managed by Course teacher as per lab. status</td></tr>
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