Department of Liberal Education
Era University, Lucknow
Course Outline
Effective From: 2023-24

Name of the Program	**B.A. / B.Sc. (LIBERAL EDUCATION)**			**Year/ Semester:**	**2nd Year/4th Semester**
Course Name	Fundamentals of Endocrinology & Nutritional Biochemistry	**Course Code:**	**BCH202**	**Type:**	**Theory**
Credits	**04**			**Total Sessions Hours:**	**60 Hours**
Evaluation Spread	**Internal Continuous Assessment:**	**40 Marks**		**End Term Exam:**	**35 Marks**
Type of Course	○ Compulsory	◉ Core		○ Creative	○ Life Skill
Course Objectives	This paper will seek to aid students to focus on the regulatory mechanism of the body: the biochemistry of hormones and nutrition in energy, growth, maintenance and reproduction.				

Course Outcomes(CO): *After the successful course completion, learners will develop following attributes:*

Course Outcome (CO)	**Attributes**
CO1	Students can identify the endocrine glands, their hormones, chemical nature, mechanism of action
CO2	They can identify and underline the causes of various common hormonal disorders
CO3	Students can understand the types of food items based on their chemical composition and role in metabolism and general methodology to prepare food chart, food preservation, additives
CO4	They can delineate the functions of various types of nutrition and can understand the regulation of various metabolic systems through nutrition and understand the relation of health with chronobiology
Pedagogy	Interactive, discussion-bases, student-centered, presentation.
Internal Evaluation Mode	Mid-term Examination: 20 Marks Class test: 05 Marks Online Test/Objective Test: 05 Marks Assignments/Presentation: 05 Marks Attendance: 05 Marks

Session Details	Topic	Hours	Mapped CO
Unit 1	**Introduction to endocrinology**: • Brief outline of various endocrine glands, their secretions and their physiological roles: hypothalamus, pituitary, pineal, thymus, thyroid, parathyroid, adrenals, pancreas, ovary, testes, gastrointestinal hormones • Hypo & hyper-secretions and related disorders and diseases in brief. • Classification of hormones and chemical composition • Transport of hormones • Functions of hormones and their regulation: Chemical signaling - endocrine, paracrine, autocrine, intracrine and neuroendocrine mechanisms. • Hormone receptors: extracellular and intracellular; Steroid hormone/ thyroid hormone receptor mediated gene regulation. **Hypothalamic - pituitary hormones**: • GH, prolactin, TSH, LH, FSH, POMC peptide family, oxytocin and vasopressin, • feedback regulation cycle.	15	CO1, CO2
Unit 2	**Hormones of adrenals**: • Aldosterone, renin angiotensin system, cortisol, epinephrine and norepinephrine. • Fight or flight response, stress response. • Pathophysiology – Addison's disease, Conn's syndrome, Cushing syndrome. **Reproductive hormones:** • Male and female sex hormones. • Interplay of hormones during reproductive cycle, pregnancy, parturition and lactation. • Hormonal control of menstrual cycle in humans. • Menopause and andropause, aging. • Hormone based contraception, hormone replacement therapy **Thyroid hormone:** • Thyroid gland. • Biosynthesis of thyroid hormone and its regulation; its physiological and biochemical action. • Pathophysiology - Goiter, Graves disease, cretinism, myxedema, Hashimato's disease	15	CO1, CO2

	Pancreatic and GI tract hormones: Regulation of release of insulin, glucagon, gastrin, secretin, CCK, GIP, adipolectin, leptin and ghrelin.		
Unit 3	**Nutritional Biochemistry**: • Concepts of Food Types and Balanced Diet. • Introduction to the terms and significance of: • Optimal dietary intakes (Dietary Reference Intakes or DRIs), SDA, RDA for every nutrient and food component at various stages of life cycle; • Respiratory Quotient, BMR, BMI, Glycemic index , Glycemic Load • Biochemistry of chemicals used in food industry: purposes & effect • Preservatives, anti-caking agents • Biochemical Food colours and taste enhancers • Chemical Food adulterants • Fundamentals of Inborn errors of metabolism and diet management • Introduction to nutrition-based public health. • Analytical methods for "profiling" human serum and urinary metabolites to assess nutritional imbalances and disease risk	15	CO3, CO4
Unit 4	**Ca2+ homeostasis:** PTH, Vitamin D and calcitonin. Mechanism of Ca2+ regulation. Pathophysiology - rickets, osteomalacia, osteoporosis **Concept of Nutrition-Drug reactions** **Overview of Biochemistry of**: Hunger, Starvation, Obesity, Diabetes & Hypertension: role of enzymes, hormones, diet and stress **Understanding the science of:** • sleep • learning and memory • stress, anxiety and depression **Relevance of biological clocks and hormones:** Circadian rhythm Chronopharmacology	15	CO3, CO4

CO-PO and PSO Mapping

CO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PSO1	PSO2	PSO3	PSO4	PSO5	PSO6
CO1	3	2	2	3	2	3	2	2	3	2	2	2	3	1
CO2	2	3	3	2	2	2	3	2	3	2	2	2	3	1
CO3	3	2	2	2	3	2	3	3	3	2	3	2	3	1
CO4	3	3	2	2	2	2	3	3	3	2	2	2	3	2

Strongcontribution-3, Averagecontribution-2, Lowcontribution-1,

Suggested Readings:	
Text-Books	1. Harrison's Endocrinology, 4E - Larry Jameson, Mcgraw Hill Publishers 2. Handbook of Applied Biochemistry, Nutrition and Dietetics ByShivanandaNayak. JaypeeBrothers Medical Publishers. 5th Edition
Reference Books	1. William's Textbook of Endocrinology. Kronenberg, Henry M. Elsevier Publications. 14th edition. 2. Endocrinology. Pandey BN, Sanjeeva K. Atlantic Publications. Latest Edition. 3. Food science and nutrition. SunetraRoday. Oxford University Press. Latest edition. 4. Nutrition and Biochemistry for Nurses. Venkatraman S, Dandekar S. Elseveir Publications, 3th Edition. 5. Nutritional Biochemistry, Sharma DC, Sharma D. CBC Publishers and Distributors. Latest edition.
Para Text	• Biochemistry of hormones: https://youtu.be/MHOpVy8VcXk • Mechanism of hormone action: https://youtu.be/aNex9vz7i3c • https://www.researchgate.net/publication/343099355_biochemistry_and_human_nutrition • Biochemistry and human nutrition http://ecoursesonline.iasri.res.in/course/view.php?id=90

Recapitulation & Examination Pattern

Component	**Marks**	**Pattern**
Mid Semester	20	**Section A:** Contains **10** MCQs/Fill in the blanks/One Word Answer/ True-False type of questions. Each question carries **0.5Marks.** **Section B:** Contains **07** descriptive questions out of which **05** questions are to be attempted. Each question carries **03 Marks**.
Class Test	05	Contains **05 descriptive questions.** Each question carries **01** Mark.
Online Test/ Objective Test	05	Contains **10 multiple choice questions.** Each question carries **0.5**Marks.
Assignment/ Presentation	05	Assignment to be made on topics and instruction given by subject teacher.
Attendance	05	As per policy.
Total Marks	**40**	

Course created by: Dr. Ghazala Zaidi
Signature:

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Signature: